MATH - MAGIC

Book 5

Textbook in Mathematics for Class V

विद्यया ऽमृतमश्नुते
एन सी ई आर टी
NCERT

राष्ट्रीय शैक्षिक अनुसंधान और प्रशिक्षण परिषद्
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FOREWORD

The National Curriculum Framework (NCF), 2005, recommends that children's life at school must be linked to their life outside the school. This principle marks a departure from the legacy of bookish learning which continues to shape our system and causes a gap between the school, home and community. The syllabi and textbooks developed on the basis of NCF signify an attempt to implement this basic idea. They also attempt to discourage rote learning and the maintenance of sharp boundaries between different subject areas. We hope these measures will take us significantly further in the direction of a child-centred system of education outlined in the National Policy on Education (1986).

The success of this effort depends on the steps that school principals and teachers will take to encourage children to reflect on their own learning and to pursue imaginative activities and questions. We must recognise that given space, time and freedom, children generate new knowledge by engaging with the information passed on to them by adults. Treating the prescribed textbook as the sole basis of examination is one of the key reasons why other resources and sites of learning are ignored. Inculcating creativity and initiative is possible if we perceive and treat children as participants in learning, not as receivers of a fixed body of knowledge.

These aims imply considerable change in school routines and mode of functioning. Flexibility in the daily time-table is as necessary as rigour in implementing the annual calendar so that the required number of teaching days are actually devoted to teaching. The methods used for teaching and evaluation will also determine how effective this textbook proves for making children's life at school a happy experience, rather than a source of stress or boredom. Syllabus designers have tried to address the problem of curricular burden by restructuring and reorienting knowledge at different stages with greater consideration for child psychology and the time available for teaching. The textbook attempts to enhance this endeavour by giving higher priority and space to opportunities for contemplation and wondering, discussion in small groups, and activities requiring hands-on experience.

National Council of Educational Research and Training (NCERT) appreciates the hard work done by the Textbook Development Committee responsible for this book. We wish to thank the Chairperson of the Advisory Committee, Professor Anita Rampal and the Chief Advisor for this book, Professor Amitabha Mukherjee for guiding the work of this committee. Several teachers contributed to the development of this textbook; we are grateful to their principals for making this possible. We are indebted to the institutions and organisations which have generously permitted us to draw upon their resources, material and personnel. We are especially grateful to the members of the National Monitoring Committee, appointed by the Department of Secondary and Higher Education, Ministry of Human Resource Development under the Chairpersonship of Professor Mrinal Miri and Professor G.P. Deshpande, for their valuable time and contribution. As an organisation committed to the systemic reform and continuous improvement in the quality of its products, NCERT welcomes comments and suggestions which will enable us to undertake further revision and refinement.

Director
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The following are applicable to all the maps of India used in this book

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1. The responsibility for the correctness of internal details rests with the publisher.
2. The territorial waters of India extend into the sea to a distance of twelve nautical miles measured from the appropriate base line.
3. The administrative headquarters of Chandigarh, Haryana and Punjab are at Chandigarh.
4. The interstate boundaries amongst Arunachal Pradesh, Assam and Meghalaya shown on this map are as interpreted from the "North-Eastern Areas (Reorganisation) Act.1971," but have yet to be verified.
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7. The spellings of names in this map, have been taken from various sources.

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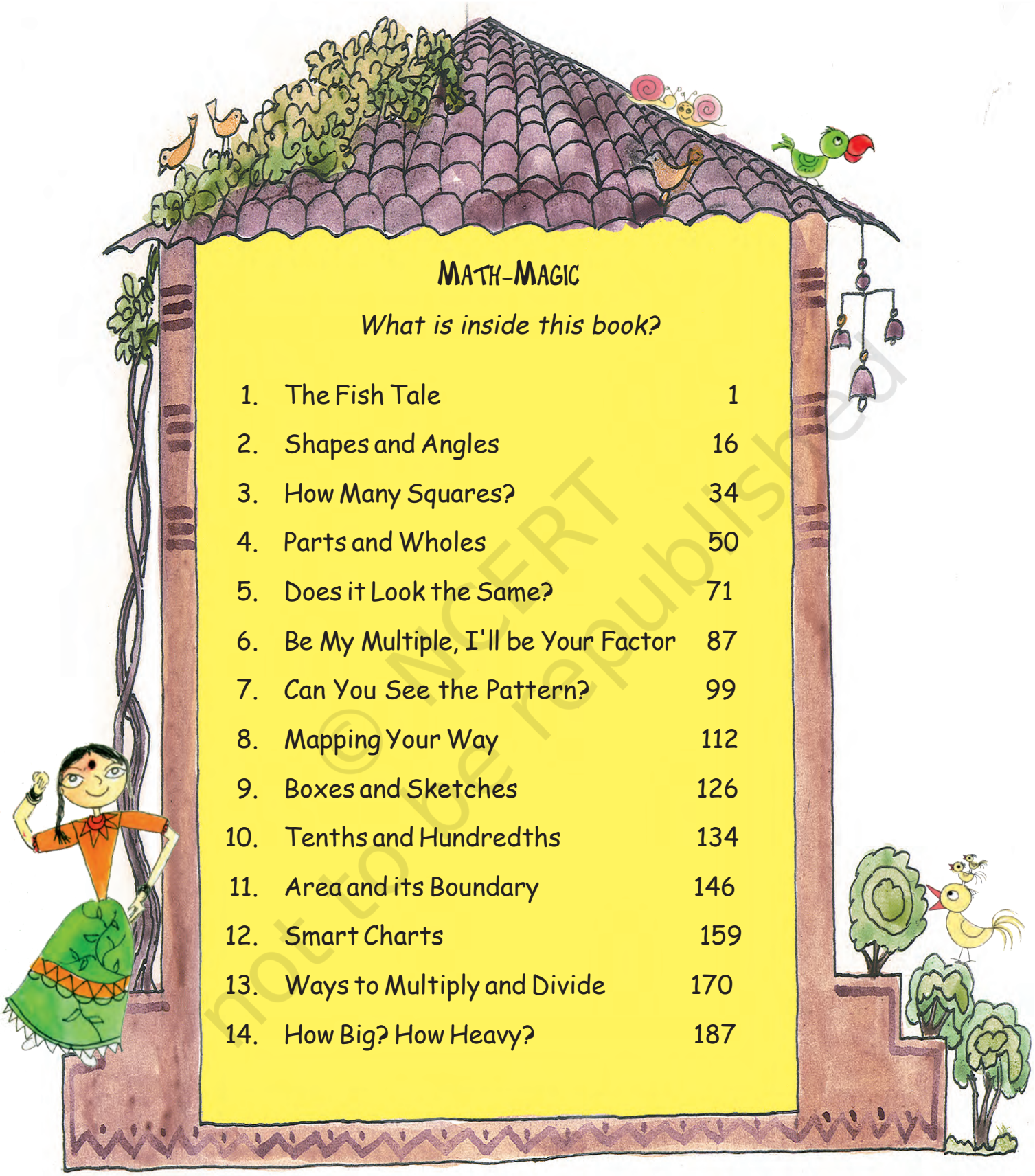

MATH-MAGIC

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Constitution of India

Part IV A (Article 51 A)

Fundamental Duties

It shall be the duty of every citizen of India —

(a) to abide by the Constitution and respect its ideals and institutions, the National Flag and the National Anthem;

(b) to cherish and follow the noble ideals which inspired our national struggle for freedom;

(c) to uphold and protect the sovereignty, unity and integrity of India;

(d) to defend the country and render national service when called upon to do so;

(e) to promote harmony and the spirit of common brotherhood amongst all the people of India transcending religious, linguistic and regional or sectional diversities; to renounce practices derogatory to the dignity of women;

(f) to value and preserve the rich heritage of our composite culture;

(g) to protect and improve the natural environment including forests, lakes, rivers, wildlife and to have compassion for living creatures;

(h) to develop the scientific temper, humanism and the spirit of inquiry and reform;

(i) to safeguard public property and to abjure violence;

(j) to strive towards excellence in all spheres of individual and collective activity so that the nation constantly rises to higher levels of endeavour and achievement;

*(k) who is a parent or guardian, to provide opportunities for education to his child or, as the case may be, ward between the age of six and fourteen years.

Note: The Article 51A containing Fundamental Duties was inserted by the Constitution (42nd Amendment) Act, 1976 (with effect from 3 January 1977).

*(k) was inserted by the Constitution (86th Amendment) Act, 2002 (with effect from 1 April 2010).

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1 The Fish Tale

0527CH01

Deep under the sea
See the lovely coloured fish
Swimming peacefully

This special poem in three lines is called a Haiku. Such poems about nature are popular in Japan. Here is another Haiku—

The lake, calm, smooth, still
A fish jumps up and returns
Ripples shake the lake

Do you know any poems about fish?

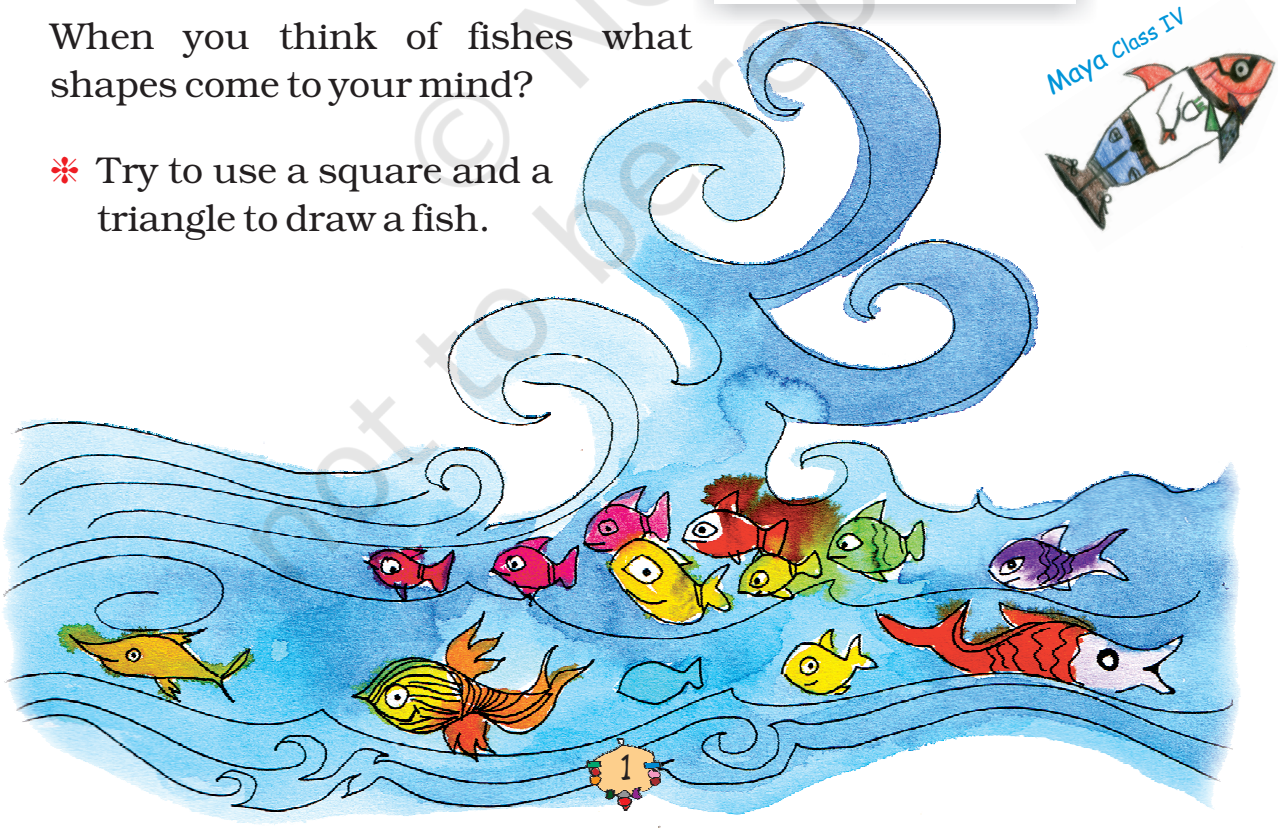
Here are some drawings made by children.

Navyata Class I

When you think of fishes what shapes come to your mind?

Maya Class IV

❊ Try to use a square and a triangle to draw a fish.



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Look for fish designs around you — on cloth, in paintings, on mats, etc.

'Meen' means a fish and 'Meenakshi' is a girl whose eyes look like a fish. Can you think of someone who has such eyes?

❊ Draw a face with 'fish eyes'.

Fishes can have very different sizes. The smallest fish is about 1 cm long. How long is the biggest fish you can imagine? _____

❊ How many times longer is your big fish than the smallest fish?

The biggest fish is the **whale shark**. It is actually not a whale but

is a big, big fish. Whales are different from fish. Whales breathe like we do, through their noses. But fish have no noses and they take in water, not air. Whales give birth to babies, but fish lay eggs. The whale shark fish looks big and dangerous, but is quite harmless. It does not attack humans.

One whale shark was as long as 18 m. Just think how long that is – almost 12 children of your size standing one on top of the other! And guess what it weighed? Well, much, much more than what 12 of you together weigh! Its weight was about 16000 kg!

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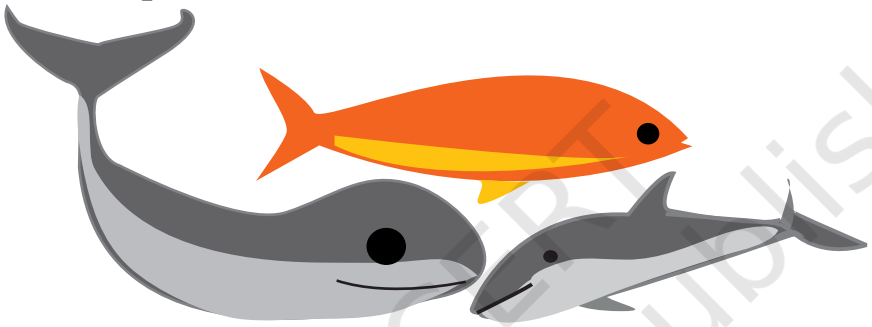
❊ About how many kilograms do you weigh? _____

❊ So 12 children like you put together will weigh about _____ kg.

❊ About how much more does the whale shark weigh than 12 children like you put together? _____

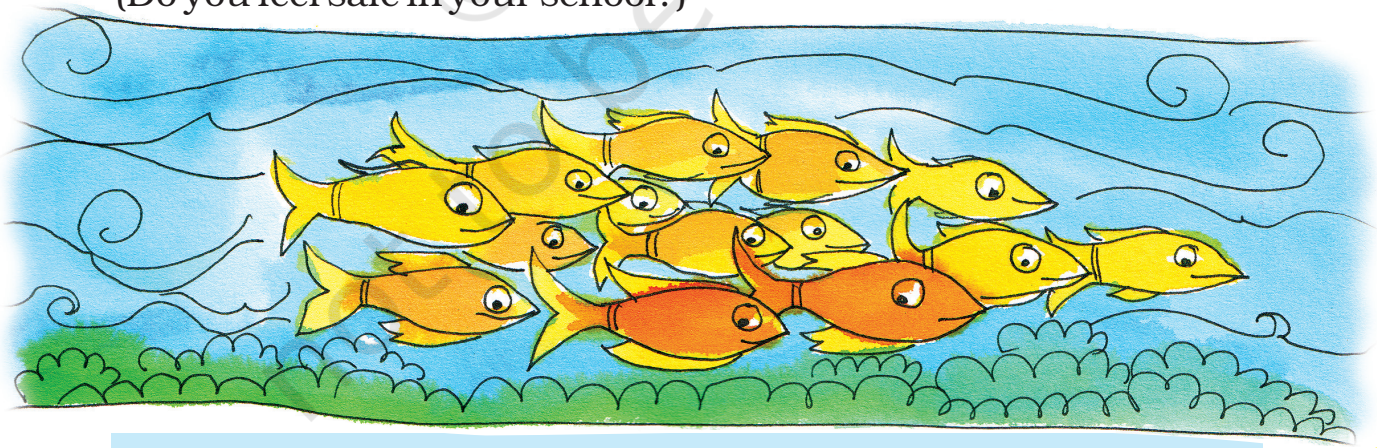
The Fish Tail

To see the difference between whales and fish look carefully at their tails. Can you see that the fish tail stands flat along its body, but the tail of the whale almost looks like two legs. Can you spot the fish in the picture?



"Schools" of Fish!

Fish like to swim together in the sea in big groups called "schools" of fish. In their school they feel safe from the bigger fish. (Do you feel safe in your school?)



This is a thematic chapter which presents to children the world of fish and fish workers through an integrated approach. Mathematical concepts, such as shapes, estimation, sense of large numbers, simple operations, speed, loans, etc. are woven into real-life contexts to allow a creative revision of some ideas learnt earlier.

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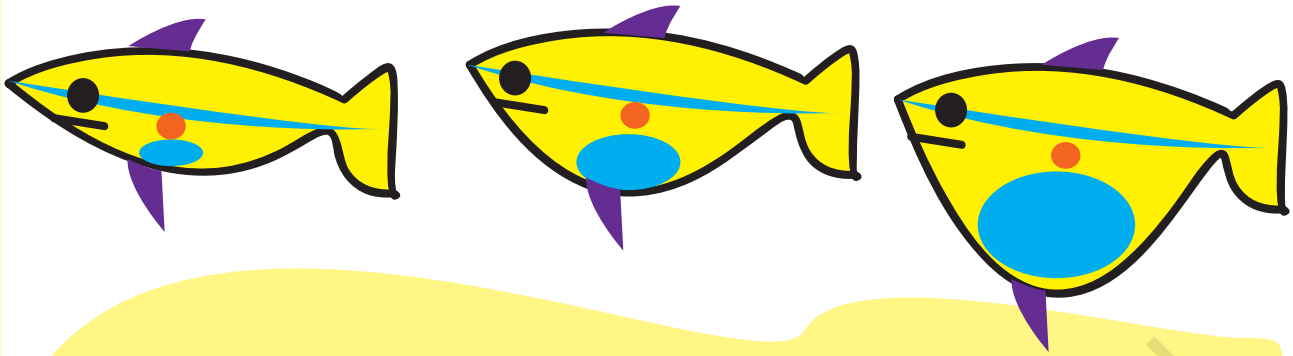
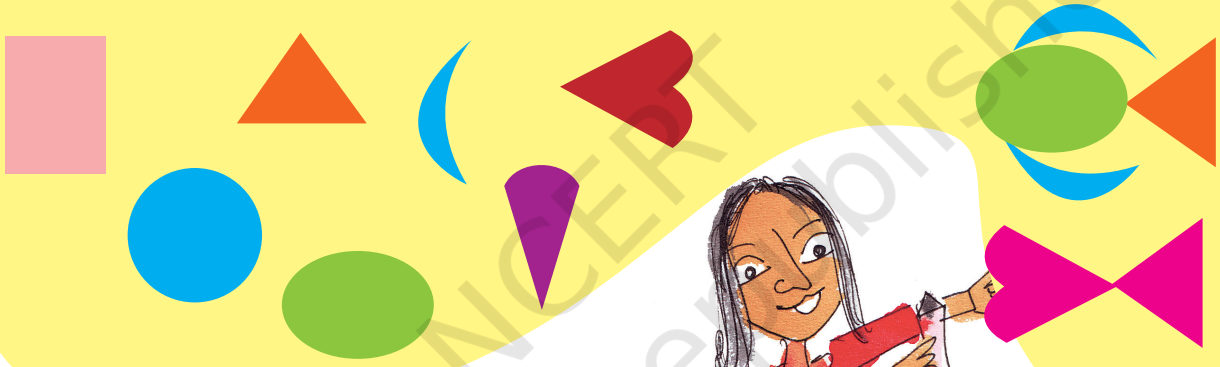
To scare away the bigger fish, some small fish drink up a lot of water, swell up and look big!



❋ Jincy used these shapes to make drawings of fish. Now you also use some shapes to draw the different sea animals shown below.



Sea urchin

Lobster

Eel

Red snapper

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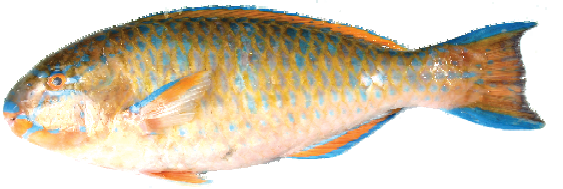
Octopus

Clam



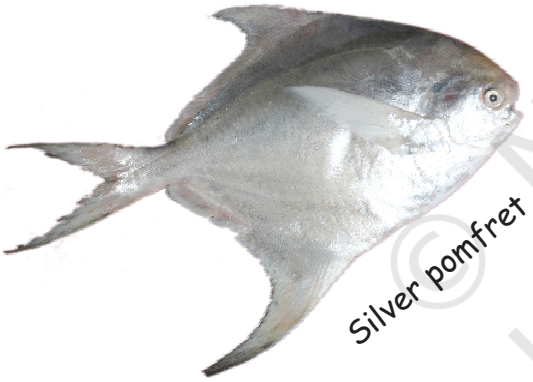
Parrot fish

Prawn

Cuttle fish

Jelly fish

Squid



Silver pomfret

Crab

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❊ Which of these sea animals have you seen before?

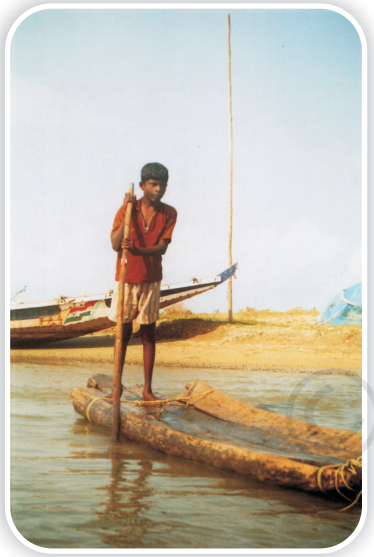
Fishermen in their Boats

How many of you have seen the sea? Where did you see it? Did you see it in a movie or for real? How deep do you think the sea could be? Find out.

Do you know how to swim? Would you be scared of the high sea waves?

❊ Close your eyes and imagine the sea with waves rising high.

❊ How high do you think the waves can go? _____



Log boat

Imagine that there are fishermen in their boats, going up and down with the waves. They start their trip when it is still dark. Some go on a simple boat made from logs of wood tied together. If the sea is rough, with very high tides and a strong wind, then these fishermen have a very difficult time.

These log boats do not go very far. If the wind is helpful, they travel about 4 km in one hour.

❊ How long will they take to go a distance of 10 km?

❊ Guess how far you can go in one hour if you walk fast.

Log boat

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Fishermen can feel the wind and look at the sun to find out which way to go. Many of us would get lost and not be able to find our way on the sea where you only see water, water, and nothing else!

Find out

Look at the sun and find out the direction from where it rises.

❊ From where you are, what interesting thing do you see to your east?

❊ Name two things that are lying to your west.

What a Catch!

Out on the sea, fishermen look for a place where they hope to find a good catch of fish. There they spread their nets. They will have to wait for many hours for the fish to come into their nets.

What a long sword-fish!

❊ Look at the different types of boats.

Some boats have motors and go further into the sea. Since they go far out they can catch more fish. These boats travel faster, at the speed of about 20 km in one hour.

Oar boat

❊ How far would the motor boats go in three and a half hours?

❊ How much time will they take to go 85 km?

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Motor boat

Motor boat

Long tail boat

Big machine boat (trawler)

But the fishermen are now very worried. There are some very big machine boats (trawlers) in the business. They go far out and put their big nets deep in the sea. This way they collect a whole lot of fish, leaving very few near the sea shore. They also stay out on the sea for many days.

These big machine boats also catch the small baby fish, which have yet to grow up. Fishermen in the smaller boats always let the baby fish pass through their nets to go back into the sea. They choose a net size in such a way that only the grown up fish are caught.

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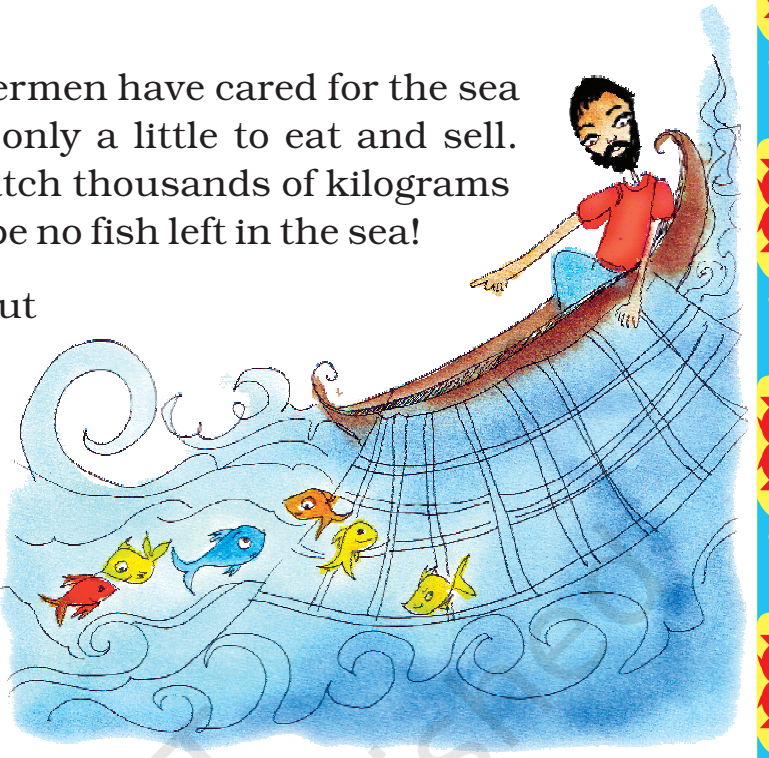
For hundreds of years fishermen have cared for the sea and its fishes, and fished only a little to eat and sell. They say that if trawlers catch thousands of kilograms of fish everyday, there will be no fish left in the sea!



* Write a news report about the dangers faced by the fishes in our rivers and seas.

Which Boat Gets How Much?

In one trip the log boat brings about 20 kg of fish. But other types of boats bring a bigger catch as given in the table. The table also shows the speed of each type of boat, which is how far each boat goes in one hour. Look at the table and calculate —

a) About how much fish in all will each type of boat bring in seven trips?

b) About how far can a motor boat go in six hours?

c) If a long tail boat has to travel 60 km how long will it take?

Type of boat	*Catch of fish in one trip (in kg)*	*Speed of the boat (how far it goes in one hour)*
Log boat	20	4 km per hour
Long tail boat	600	12 km per hour
Motor boat	800	20 km per hour
Machine boat	6000	22 km per hour

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Some Big, Big Numbers!

In the Class IV Math-Magic you heard of the number **'lakh'** which is equal to a hundred thousand. You had read that there are about one lakh brick kilns in our country, where bricks are made.

- What other things have you heard of in lakhs?
- Write the number one thousand. Now write one hundred thousand. So how many zeroes are there in the number one lakh? Easy, isn't it?
- There are about two lakh boats in our country. Half of them are without a motor. What is the number of boats with a motor? Write it.
- About one fourth of the boats with a motor are big machine boats. How many thousand machine boats are there? Come on, try to do it without writing down.

We might wonder about the number of people whose lives are related to fish. In all there are about one hundred lakh fishworkers — who catch fish, clean and sell them, make and repair nets and boats, etc. We also have a name for this big number — **'one hundred lakh'** is called a **crore**.

- Where have you heard of a crore? What was the number used for?
- Try writing the number one crore. Don't get lost in all the zeroes!

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The Fish Market

Have you been to a fish market? If you have then you might know why a very noisy place is sometimes called a 'fish market'!

This fish market is busy today. Many boats have brought a good catch. The fisherwomen are shouting out their prices to the buyers.

Mini — "Come here! Come here! Take sardines at ₹ 40 a kg".

Gracy — "Never so cheap! Get sword-fish for ₹ 60 a kg".

Floramma sells prawns for ₹ 150 a kg.

Karuthamma sells squid for ₹ 50 a kg.

Look, Fazila can hardly carry this big kingfish! She says, "This fish weighs 8 kg. I will sell the whole for ₹ 1200".

Practice Time

1) At what price per kg did Fazila sell the kingfish?

2) Floramma has sold 10 kg prawns today. How much money did she get for that?

3) Gracy sold 6 kg sword fish. Mini has earned as much money as Gracy. How many kg of sardines did Mini sell?

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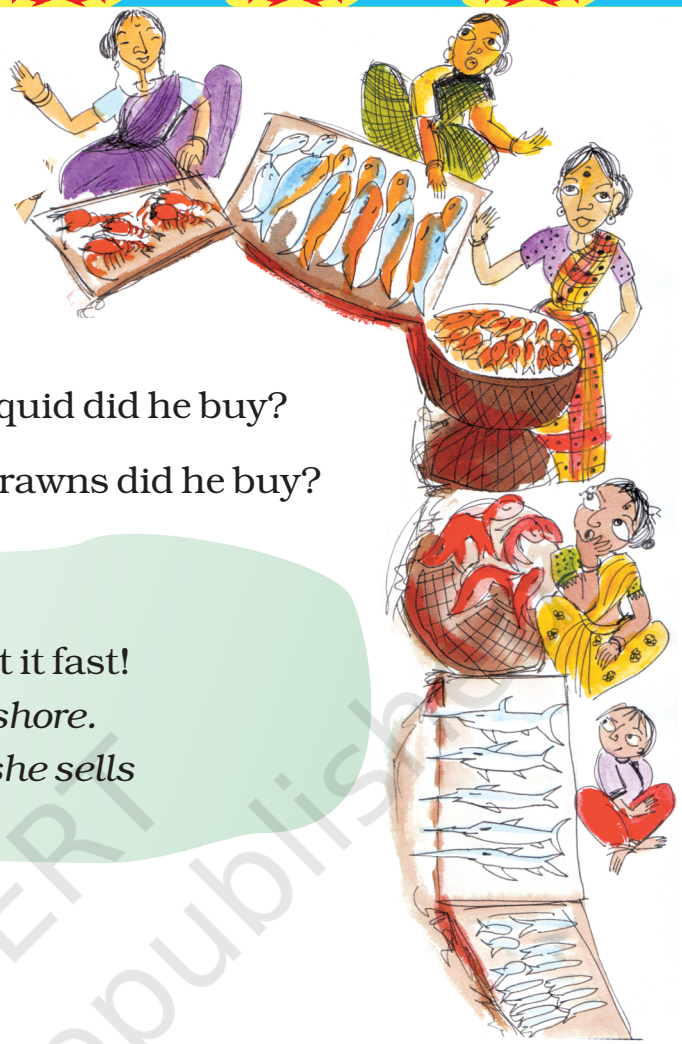

4) Basheer has ₹ 100. He spends one-fourth of the money on squid and another three-fourth on prawns.

a. How many kilograms of squid did he buy?

b. How many kilograms of prawns did he buy?

Try saying this fast!

Here is a tongue twister. Repeat it fast!
She sells sea shells on the sea-shore.
She is sure that the shells that she sells
will be there no more.

Women's 'Meenkar Bank'

The meeting of the Meenkar Bank has just begun. Fazila is the president. Twenty fisherwomen have made their own bank. Each saves ₹ 25 every month and puts it in the bank.

- How much money does the group collect each month?
- How much money will be collected in ten years?

Practice time

Gracy needs money to buy a net. Jhansi and her sister want to buy a log boat. So they take a loan from their bank. They will return it with interest.

a) Gracy took a loan of ₹ 4000 to buy a net. She paid back ₹ 345 every month for one year. How much money did she pay back to the Bank?

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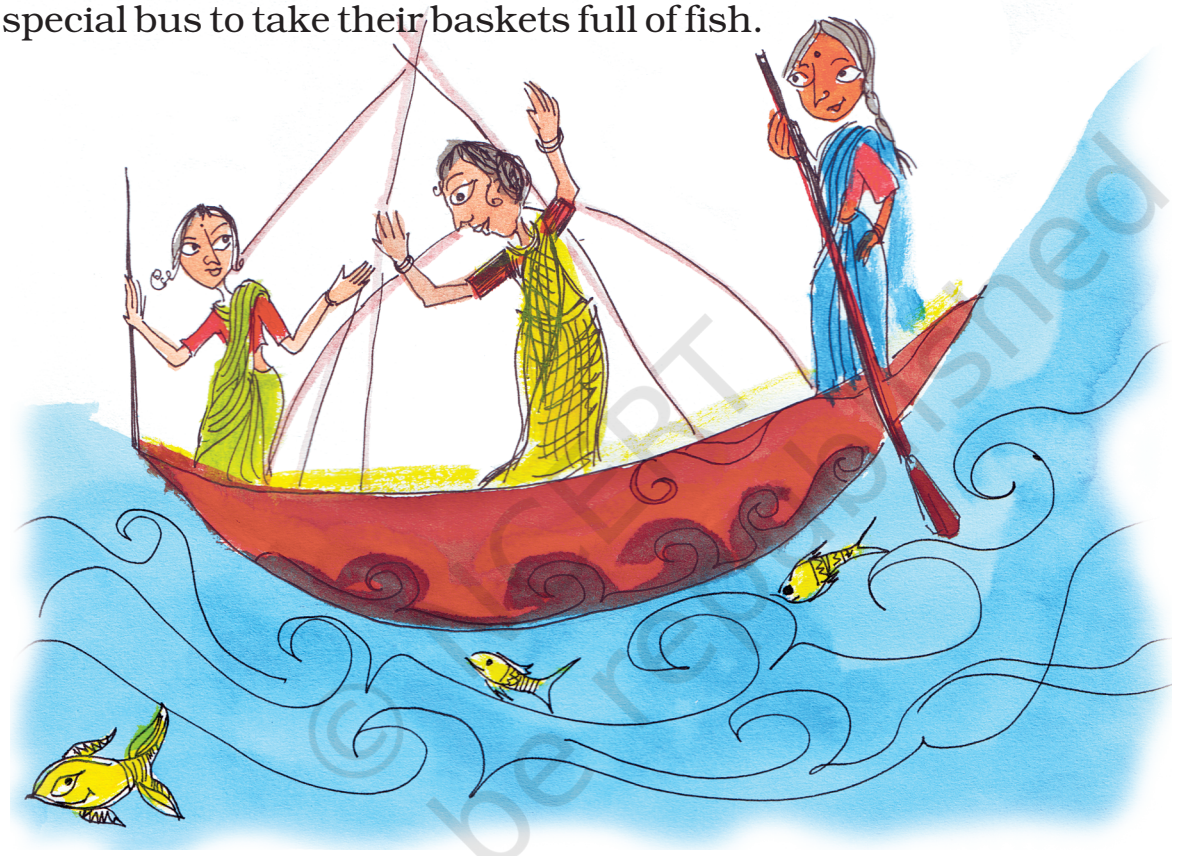
b) Jhansi and her sister took a loan of ₹ 21,000 to buy a log boat. They paid back a total of ₹ 23,520 in one year. How much did they pay back every month?

Earlier women did not go on the boat to fish. But now Jhansi and some others are going on the boats during the day. Things are changing now and their Bank helps them. They have also got a special bus to take their baskets full of fish.



Why Don't We Start a New Fish-drying Factory?

The women of Meenkar Bank also want to start a factory to dry fish. The Panchayat has given them some land for that. Over the years they have saved ₹ 74,000. They find out how much they will need for the factory.

Fazila writes the things they need to buy to begin. See the table for the cost of each item and the number of items they want to buy. Find the total cost.

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Item	*Price of each*	*Number of items*	*Cost*
Bore well for fresh water	₹ 3000	1	
Bamboo rack for fish drying	₹ 2000	20	
Cement tank	₹ 1000	4	
Tray and knife	₹ 300	20	
Bucket	₹ 75	20	

Total cost to set up the factory = _____

When fresh fish is dried it becomes $\frac{1}{3}$ its weight.

In one month they plan to dry 6000 kg of fresh fish.

How much dried fish will they get in a month? _____

Floramma — Let us first calculate for 6 kg of fresh fish.

We buy fresh fish for	₹ 15 per kg
We sell dried fish for	₹ 70 per kg

We dry 6 kg fresh fish to get _____ kg dried fish

For 6 kg fresh fish we have to pay 6 × __ = ₹ 90

We will sell 2 kg dried fish and get 2 × __ = ₹ __

So if we dry 6 kg fresh fish we will earn __ _ 90 = ₹ __

But if we dry 6000 kg we can earn ₹ __ × 1000 in one month!

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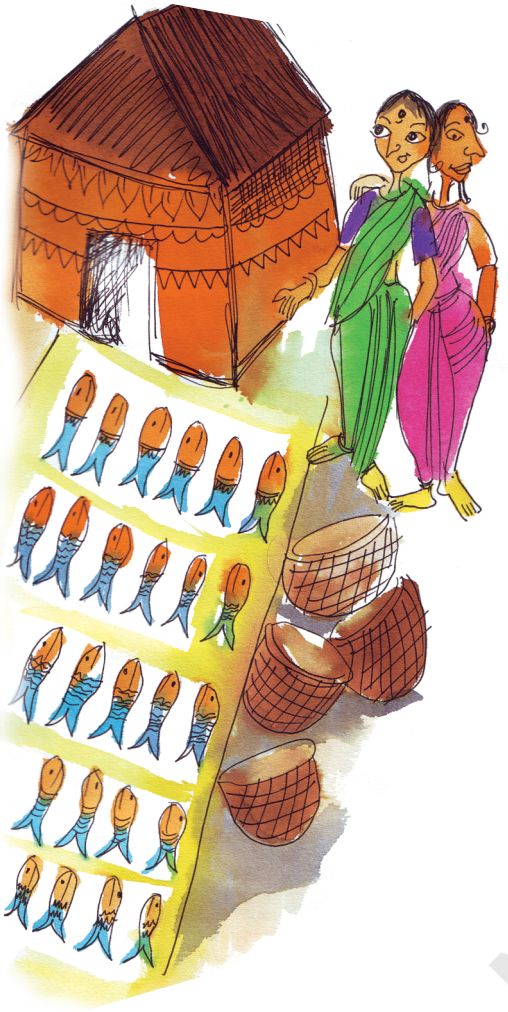

They are all very happy with this plan. The group can make profits and each woman can get a salary for the work she does.

Jhansi — I found that for 6000 kg fish we would need 1500 kg salt every month! Its price is ₹ 2 per kg.

Monthly costs:

a) Salt 1500×2 = ₹ ____

b) Packing and bus charges = ₹ 3000

So the total monthly cost of drying, packing and bus charges = ₹ ____

Fazila — That sounds very good! Our calculations tell us that every month our Bank will earn ₹ 44,000!

❊ Check to see if you also get the same answer.

Find out

Songs sung by fishermen are beautiful. Find out about the words and tunes of such songs.

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0527CH02

2 Shapes and Angles

Rohini and Mohini are twin sisters. They love doing the same things. One day when they were making shapes with matchsticks, Shaila gave them a challenge.

Rohini made this shape.

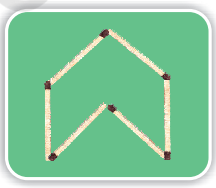
Mohini — Is it a closed shape or an open shape?

Rohini — It is a closed shape.

Mohini — How many sides are there?

Rohini — It has 6 sides.

Mohini made this.

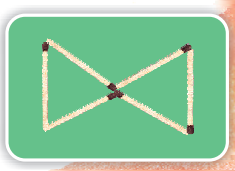


Now you give the answers.

Is it a closed shape? _____. Does it have 6 sides? _____.

But it is not the same as the one made by Rohini. So Mohini tried again.

This is what she made.



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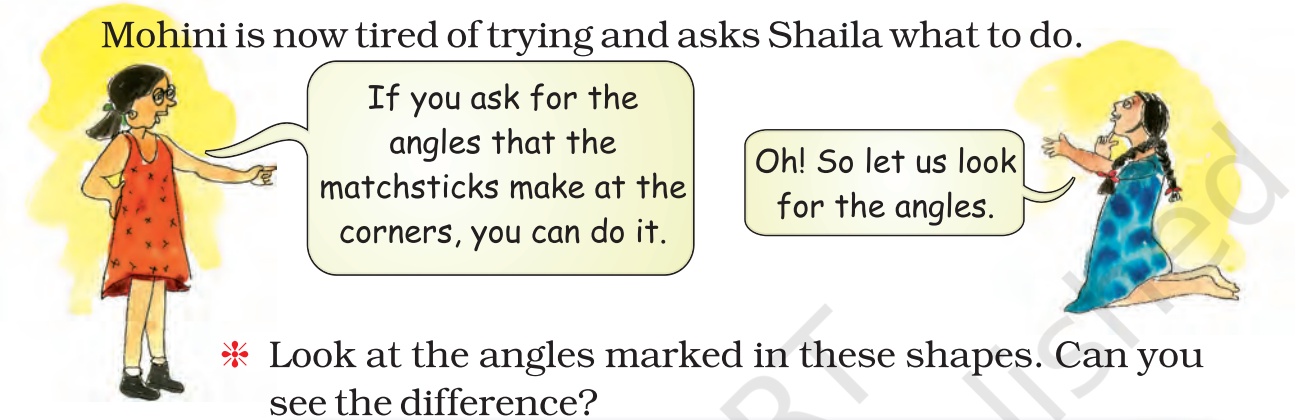
Is it a closed shape with 6 sides? _____

Is it the same as the one made by Rohini? _____

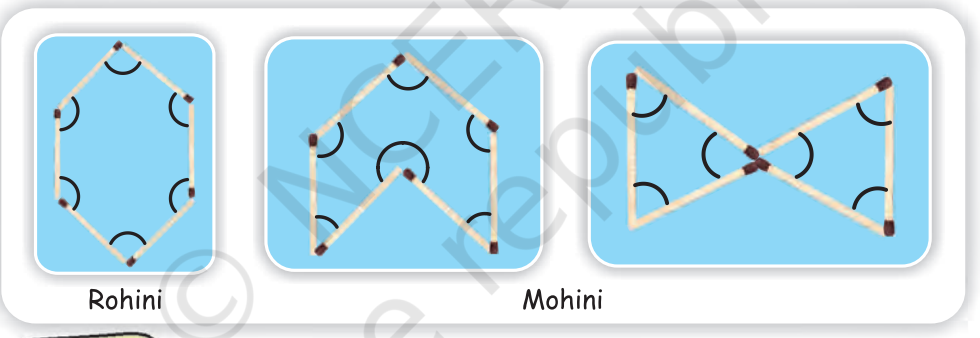
Is there some way to say in what way these shapes are different?

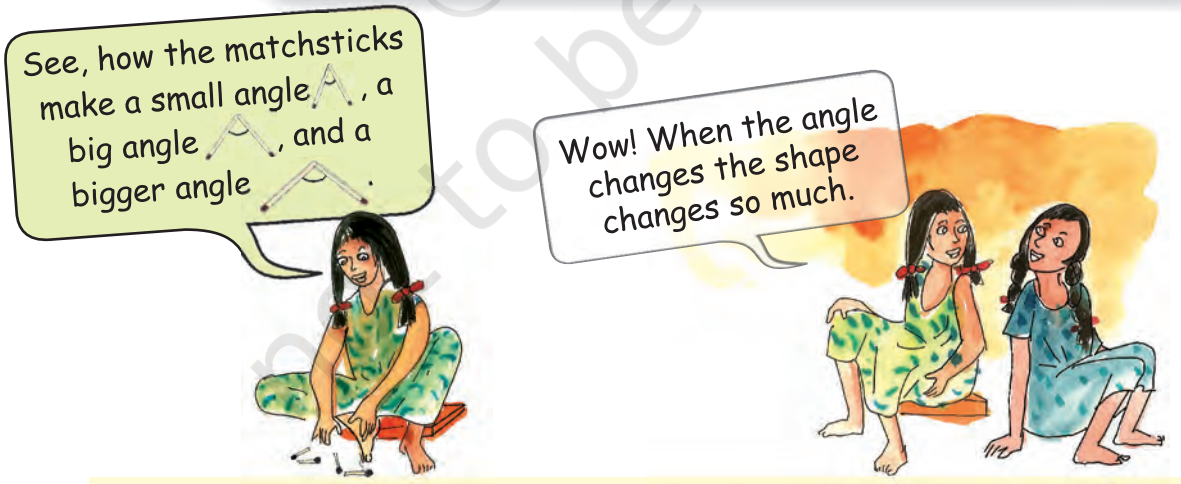
❊ Mohini tried again but got different shapes. Guess and make two more shapes Mohini could have made.

Mohini is now tired of trying and asks Shaila what to do.



❊ Look at the angles marked in these shapes. Can you see the difference?





It is important to encourage children to think about the way in which shapes can differ even when the number of sides is the same. This will help them to get a sense of how angles determine the shape of a polygon.

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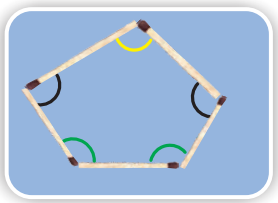
Practice Time



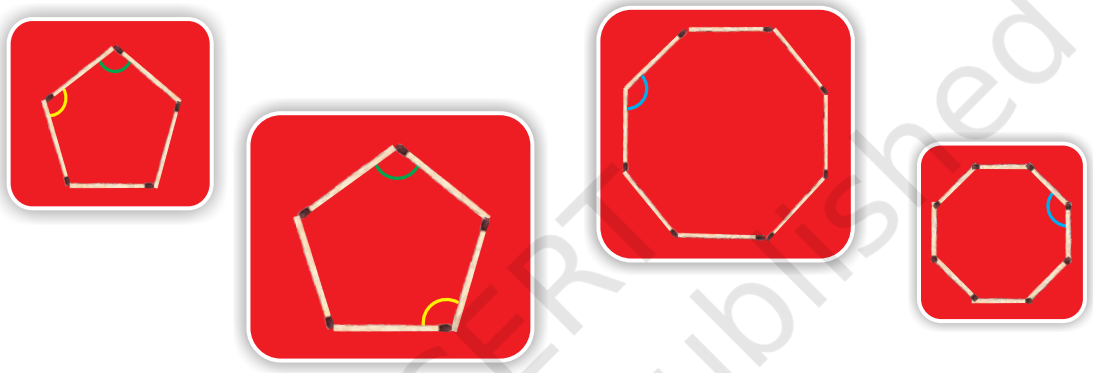
1) Look at the shape and answer.

   ⁂ The angle marked in _____ colour is the biggest angle.

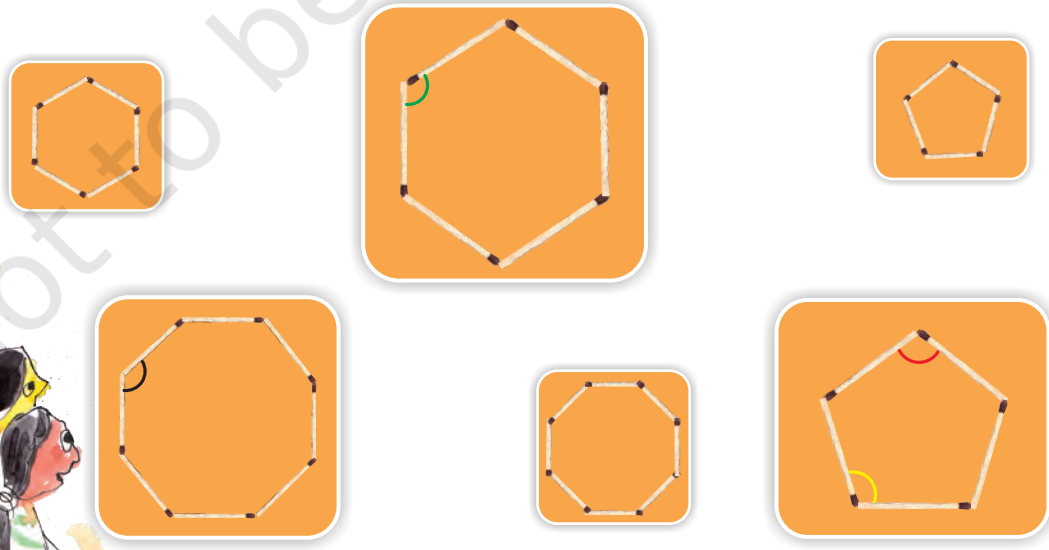
2 (a) Are the angles marked with yellow equal? _____

   b) Are the angles marked with green equal? _____

   c) Are the angles marked with blue equal? _____



3) Four different angles are marked in four colours. Can you find other angles which are the same as the one marked in red? Mark them in red. Do this for the other colours.



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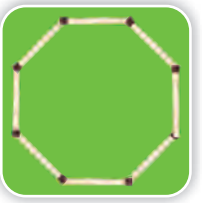
4) How many different shapes can you make by changing the angle between the matchsticks in each of these? Try.

a)

4 matchsticks

b)



8 matchsticks

c)

5 matchsticks

d)

7 matchsticks

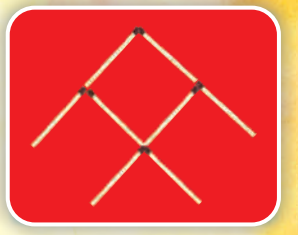
e)

10 matchsticks

Matchstick Puzzles

1) Make 8 triangles using 6 matchsticks. Try!

2) Take 8 matchsticks and make a fish like this. Now pick up any 3 matchsticks and put them in such a way that the fish now starts swimming in the opposite direction. Did it?



3) Using 10 matchsticks make this shape. Pick up 5 matchsticks and put them in such a way that you get the shape of a house.

If you have not been able to solve these then look for the answers on page 29.

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Angle Tester

- Cut two strips from a cardboard sheet.
- Fix them with a drawing pin or such that both the strips can move around easily.

Rohini and Mohini went all around with the angle tester to look for different angles in their class.

Rohini tested the angle of the Maths book and the pencil box.

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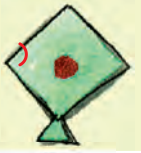
❊ Go around with your tester and draw here those things in which the tester opens like the letter L. Are you sure they are all right angles?

Practice time

1) Look at the angles in the pictures and fill the table.

Angle	*Right angle*	*More than a right angle*	*Less than a right angle*
			✓
			

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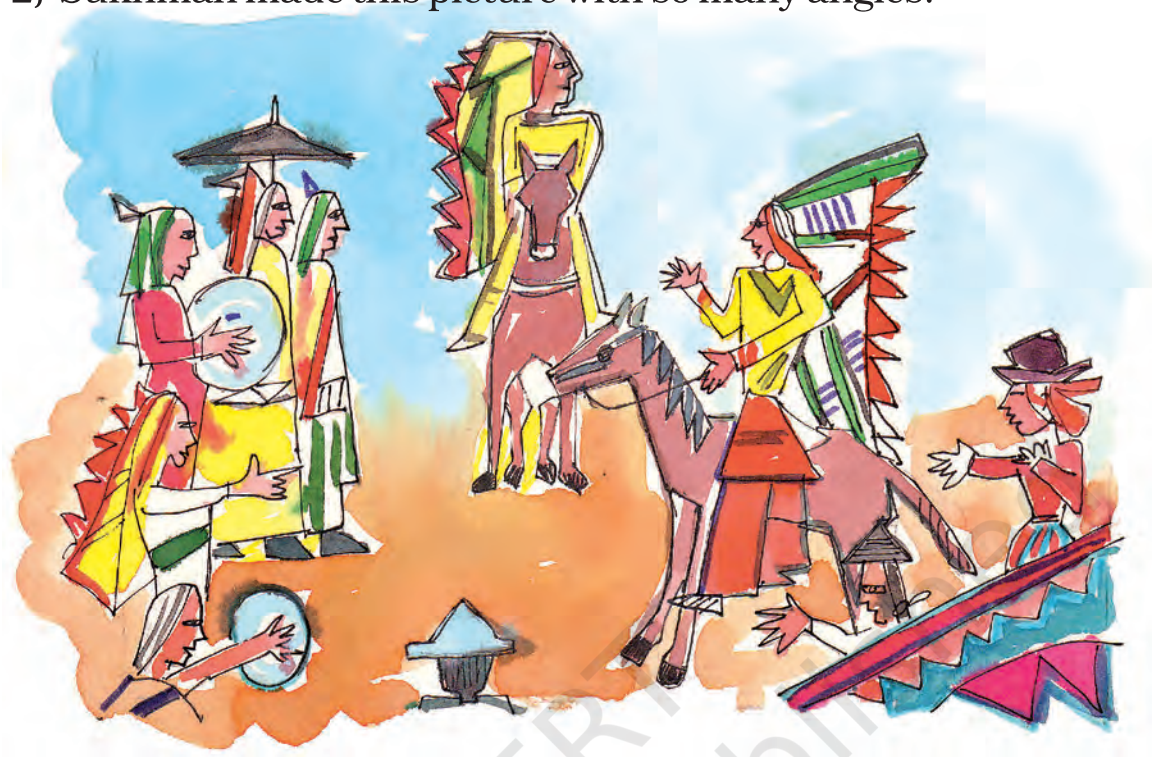
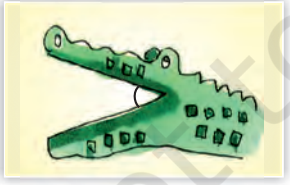
2) Sukhman made this picture with so many angles.



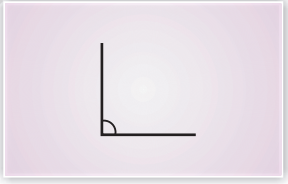
Use colour pencils to mark.

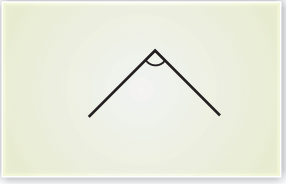
- right angles with black colour.
- angles which are more than a right angle with green.
- angles which are less than a right angle with blue.

3) Draw anything of your choice around the angle shown. Also write what kind of angle it is. The first one is done.



Less than a right angle





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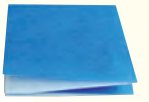
Activity

a) Take a square sheet of paper.

b) Fold it in half.

c) Fold it once more and press it.



d) Open the last fold so that the sheet is folded in half.

e) Take one corner and fold it to meet the dotted line.

On the paper you will find lines making a right angle, an angle less than a right angle and an angle more than a right angle.

Look for each of the angles and mark them with different colours.

Activity — Angles with your body

Can you make these angles?

a) A right angle with your hand?

b) An angle less than a right angle with your leg?

c) An angle more than a right angle with your arm?

d) An angle more than a right angle with your body?

Try them out. It's fun! Draw them in your notebook using stick drawings like these.

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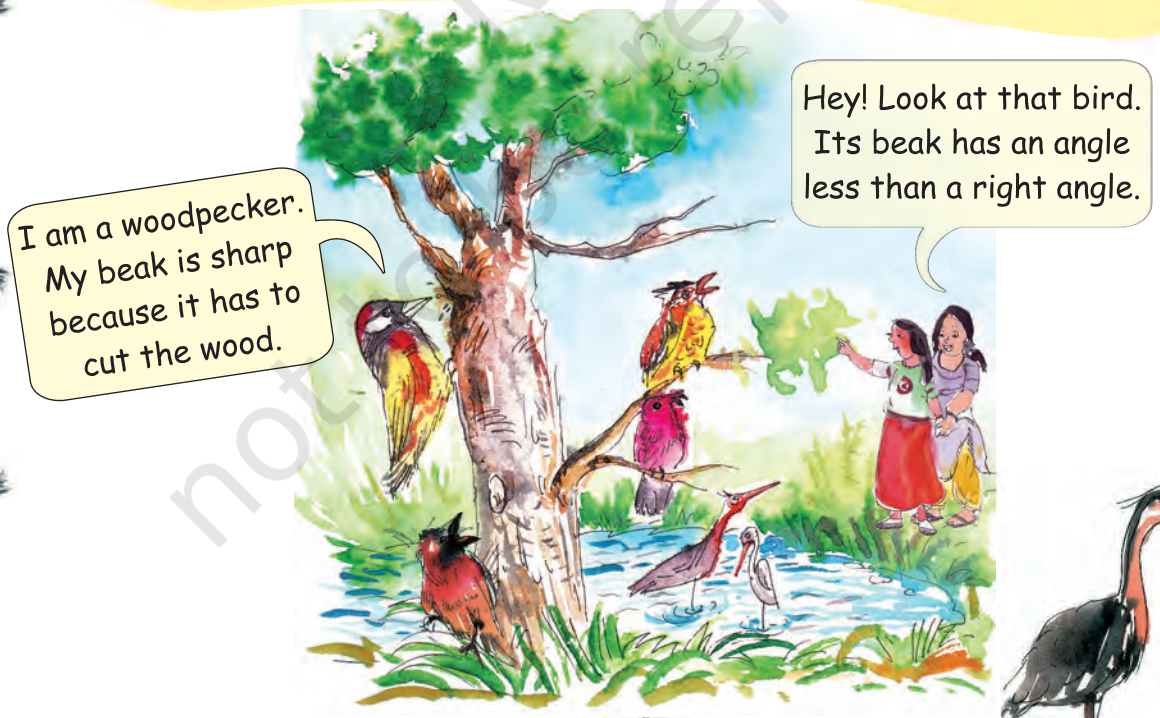
Angle Garden

Activity

Collect some leaves from the garden. Colour each leaf and print it. Look at the angles on the leaves. Which of them are more/less than a right angle?



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❊ Look for the birds which have beaks with angles smaller than a right angle.

❊ In the picture mark angles between the two branches. Which two branches have the biggest angle?

Angles in Names

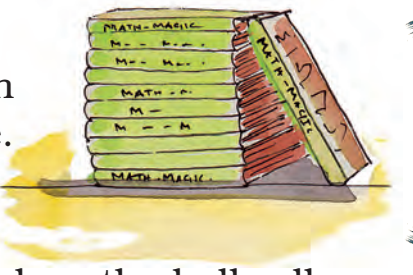
In my name there are 11 right angles. There are also 10 angles less than a right angle.

❊ Write 3 names using straight lines and count the angles.

Name	*Number of right angles*	*Number of angles more than a right angle*	*Number of angles less than a right angle*

Activity

a) Put 10 Math-Magic books on top of each other. Keep one book slanting to make a slide.



b) Now do this with six books.

❊ Roll a ball from the top. From which slide does the ball roll down faster?

❊ Which slide has the smaller angle?

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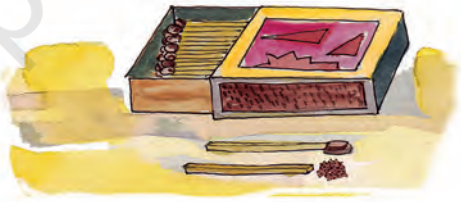
These are two slides in a park.

- Which slide has a larger angle?
- Which slide do you think is safer for the little boy? Why?

Changing Shapes

- Things you need — used (or new) matchsticks. Piece of rubber tube used in cycle valves.

i) Clean the black end of the matchsticks.



ii) Cut small pieces of the tube (about 1 cm long).

iii) Push two matchsticks into each end of a tube piece.

iv) Add more matchsticks to form a triangle.

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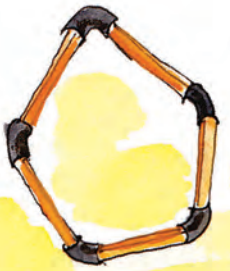
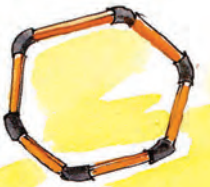
Now make these 4, 5, 6 sided shapes by using tube pieces and matchsticks.

a)

b) 

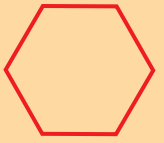
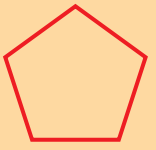
c) 

❊ Find out how many angles are there in each of these shapes. Mark them.

Now push each shape downwards with the tip of your finger.

Does the angle change when pushed down by the finger?

❊ Find out and write your results in the table given.

Shape	*Change in angle Yes/no*
	
	

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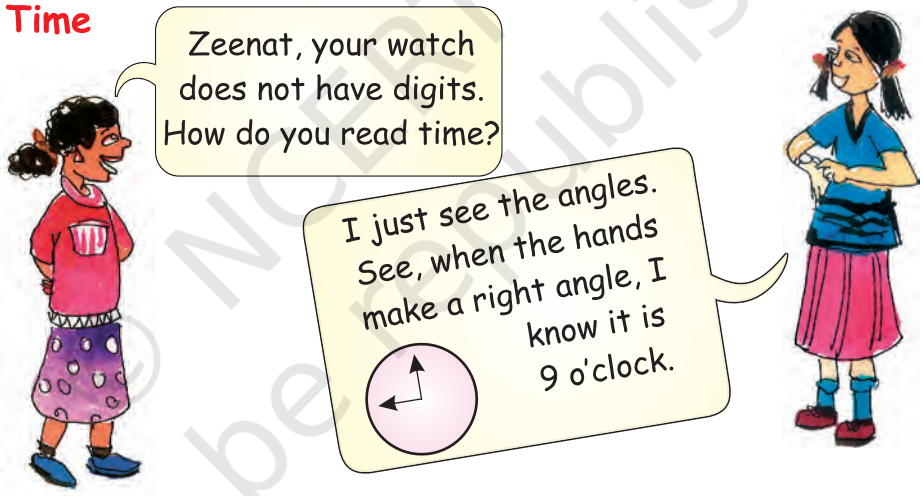
Shapes and Towers

Look for triangles in the pictures below.

❊ From the activity 'Changing Shapes' can you guess why triangles are used in these towers, bridges etc?

❊ Look around and find out more places where triangles are used.

Angle and Time



❊ There are many times in a day when the hands of a clock make a right angle. Now you draw some more.

Triangles are shapes which are strong and do not change easily when pressed. In fact, children can also observe how different shapes are made stronger by using diagonal beams (like in the bridge) which divide shapes into triangles.

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❊ Write what kind of angle is made by the hands at these times. Also write the time.

❊ Draw the hands of the clock when they make an angle which is less than a right angle. Also write the time.

Answers: Matchstick Puzzles (page 19)

1.

2.

3.

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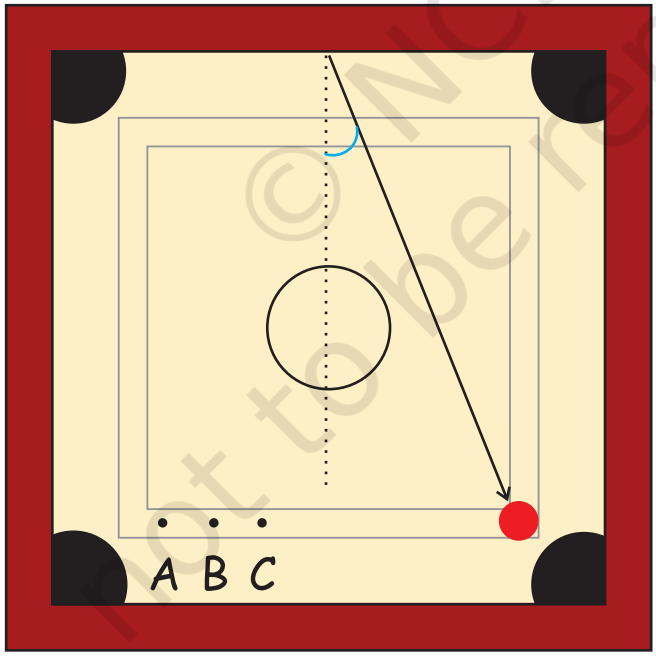
Degree Clock

Appu and Kittu are playing carromboard. Appu hit the striker.

❊ In the picture three points A, B and C are shown. Draw a line to show from which point Kittu should hit to get the queen. _____



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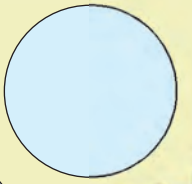
Activity: Making a degree clock

1. Cut a circle out of paper.

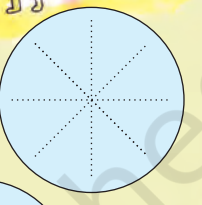


2. Fold it into half.

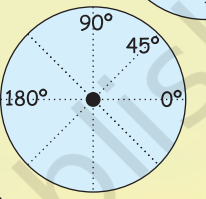
3. Fold it once again into a quarter.

4. Fold it once more.

5. Open the paper. You will see lines like this.

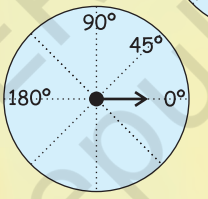


6. Now mark 0°, 45°, 90° and 180° as shown.

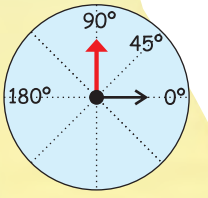


7. Paste it on an old card.

8. From the centre draw one hand.



9. Make a red hand with a thick paper and fix it to the centre with a drawing pin, so that it is free to move.



Your degree clock is ready.

- Use your degree clock to measure the right angle of your pencil box. _____ is the measure of the right angle.
- Can you guess how many degrees is the angle which is —
  - $\frac{1}{2}$ of a right angle _____
  - $\frac{1}{3}$ of a right angle _____
  - 2 times of a right angle _____

- Measure the angle from where Kittu should hit the striker on page 30.

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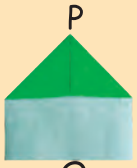
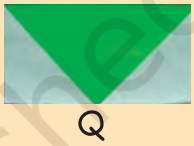
Angles in a Paper Aeroplane

1. Take a square sheet of paper.

2. Fold it in half and open it.

3. Fold the corners to the centre. Your paper looks like this. 

4. Fold the green triangle such that P touches Q. 

5. Fold the top two corners of this rectangle along the dotted lines.

6. Your paper will look like this. There is a small triangle in the picture which has to be folded up.

7. Turn it over and fold it in half along the dotted line.

8. Now, to make a wing fold the yellow edge over the red edge.

9. Turn it and do the same on the other side as well.

Your plane is ready to fly. How well does it fly?

❊ Find the angles of 45° and 90° when you open your plane.

In the aeroplane there are folds of 45°, 90° and other angles. The cut-outs of 30° and 60° are on the last page of the book. Children can be encouraged to measure various angles around them.

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Reprint 2024-25

Angles with Yoga

Rahmat is doing Yoga. These are the pictures of different 'Asanas' he does everyday.

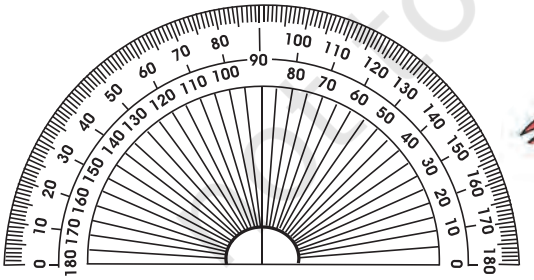
* Estimate the measure of many angles as you can made by different parts of the body while doing 'Asanas'.

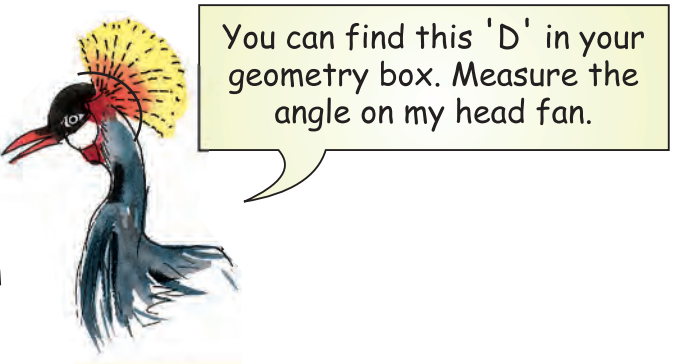
The D Game

You can play the 'D' game with your friends. You draw an angle. Your friend will guess the measure of that angle. Then you use your 'D' to measure it. The difference between the measured angle and the guess will be your friend's score. The one with the lowest score will be the winner.

Come on, play!

Draw Angle	*Guess*	*Measure*	*Score*





Take this opportunity to introduce the 'D' (protractor). Children will need some help to read the measure of the angle, but they need to do so only approximately.

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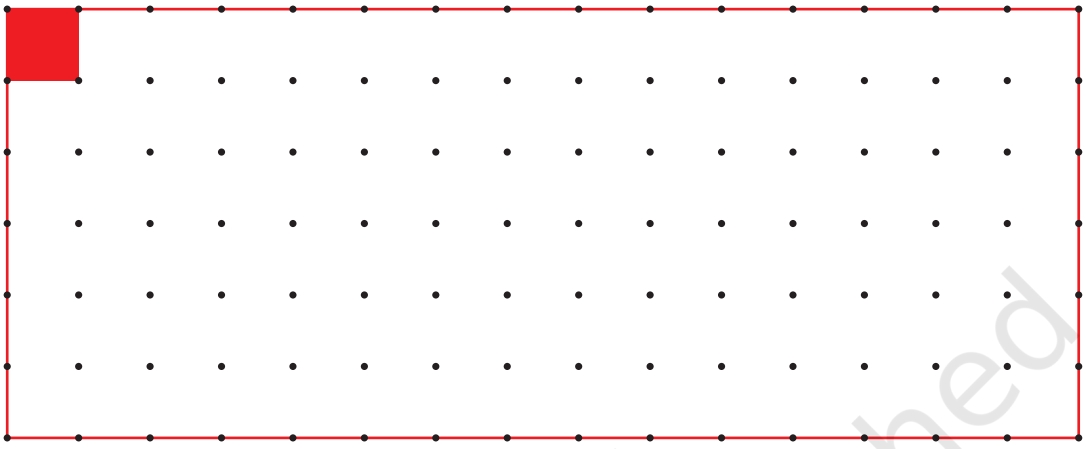
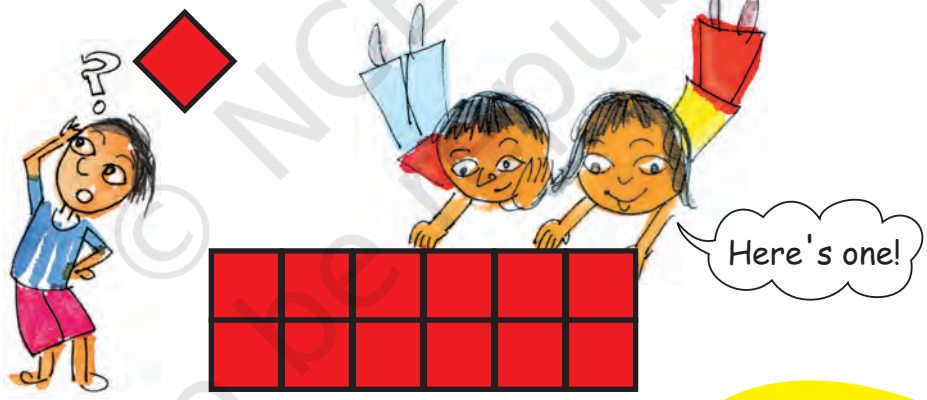
0527CH03

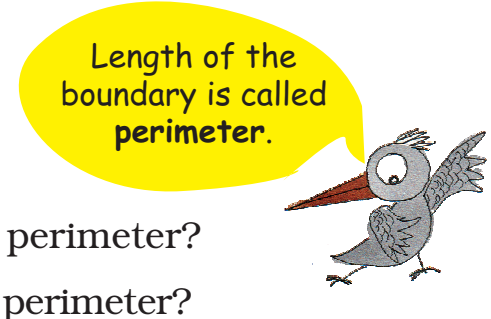
3 How Many Squares?



- Measure the side of the red square on the dotted sheet. Draw here as many rectangles as possible using 12 such squares.
- How many rectangles could you make? _____



Each rectangle is made out of 12 equal squares, so all have the same area, but the length of the boundary will be different.



- Which of these rectangles has the longest perimeter?
- Which of these rectangles has the smallest perimeter?

Children are not expected to learn the definition of the term 'area', but develop a sense of the concept through suitable examples. Give them many opportunities in the classroom to compare things in terms of area and guess which is bigger. Things like stamps, leaves, footprints, walls of the classroom etc. can be compared.

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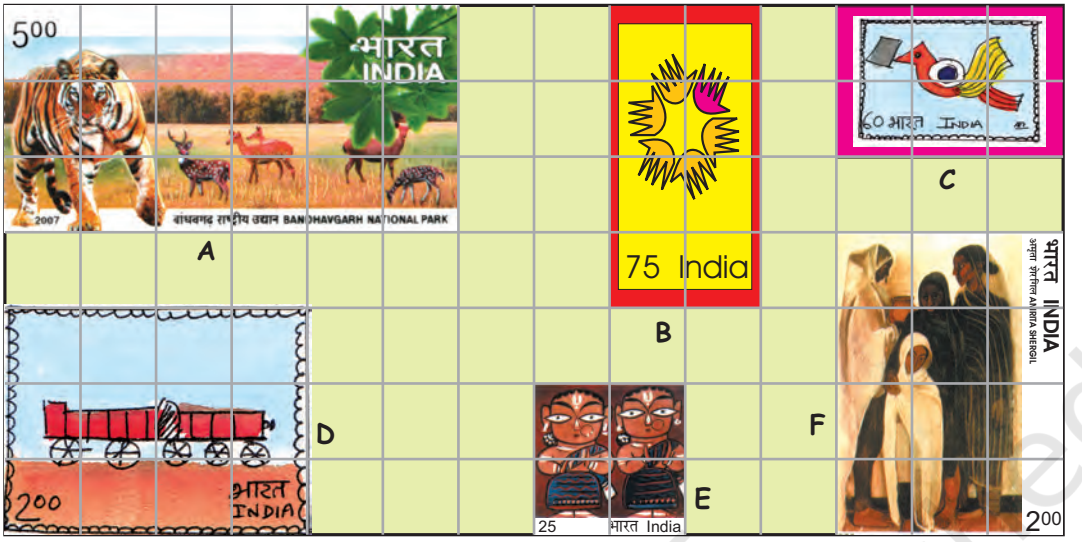
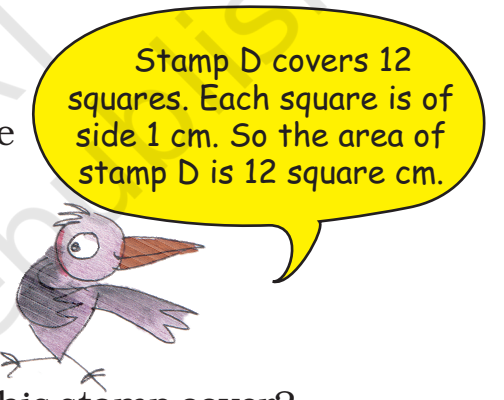
Measure Stamps



Look at these interesting stamps.



a) How many squares of one centimetre side does stamp A cover? _____

And stamp B? _____

b) Which stamp has the biggest area?

How many squares of side 1 cm does this stamp cover?

How much is the area of the biggest stamp? _____ square cm.

c) Which two stamps have the same area? _____

How much is the area of each of these stamps? ____ square cm.

d) The area of the smallest stamp is _____ square cm.

The difference between the area of the smallest and the biggest stamp is _____ square cm.

Collect some old stamps. Place them on the square grid and find their area and perimeter.

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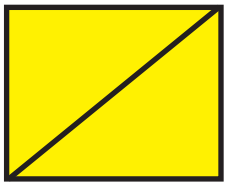
Guess

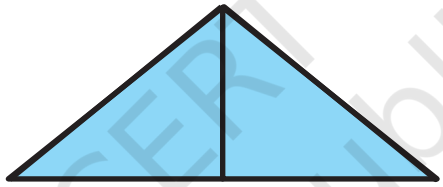
a) Which has the bigger area — one of your footprints or the page of this book?

b) Which has the smaller area—two five-rupee notes together or a hundred-rupee note?

c) Look at a 10 rupee-note. Is its area more than hundred square cm?

d) Is the area of the blue shape more than the area of the yellow shape? Why?





e) Is the perimeter of the yellow shape more than the perimeter of the blue shape? Why?

How Big is My Hand?

Trace your hand on the squared sheet on the next page.

How will you decide whose hand is bigger — your hand or your friend's hand?

What is the area of your hand? _____ square cm.

What is the area of your friend's hand? _____ square cm.

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My Footprints

- Whose footprint is larger — yours or your friend's?
- How will you decide? Discuss.
- Is the area of both your footprints the same?

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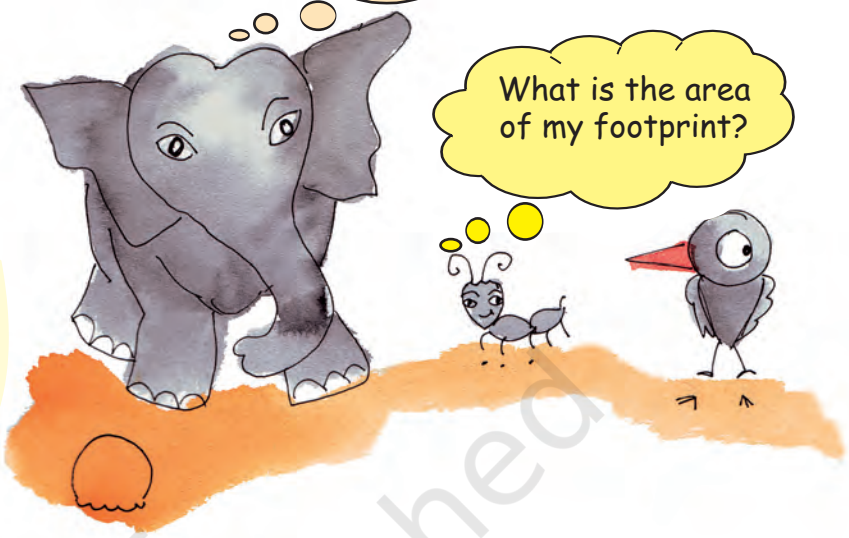
My skin has many many folds. So I have a big area! This way the air all over me keeps me cool.

Baby Rhino

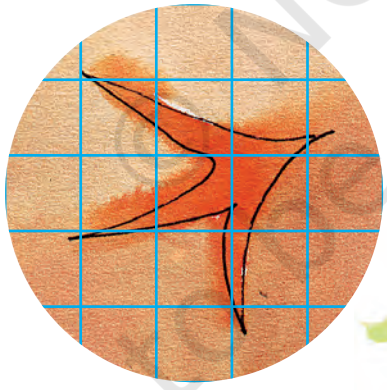
What is the area of my footprint?

What is the area of my footprint?

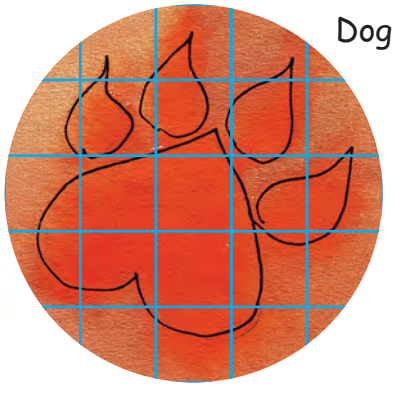


- Guess which animal's footprint will have the same area as yours. Discuss.
- Here are some footprints of animals — in actual sizes. Guess the area of their footprints.

Hen



Dog



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Make big squares and rectangles like this to find the area faster.

Tiger

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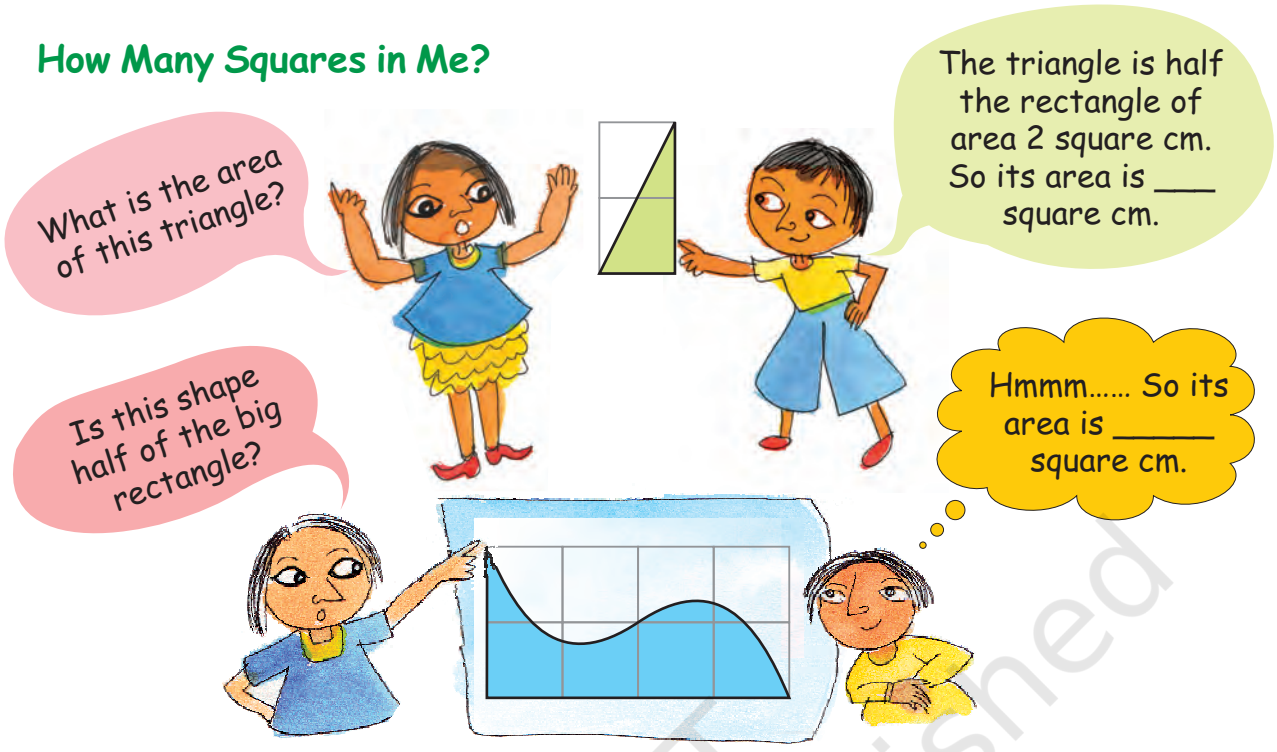
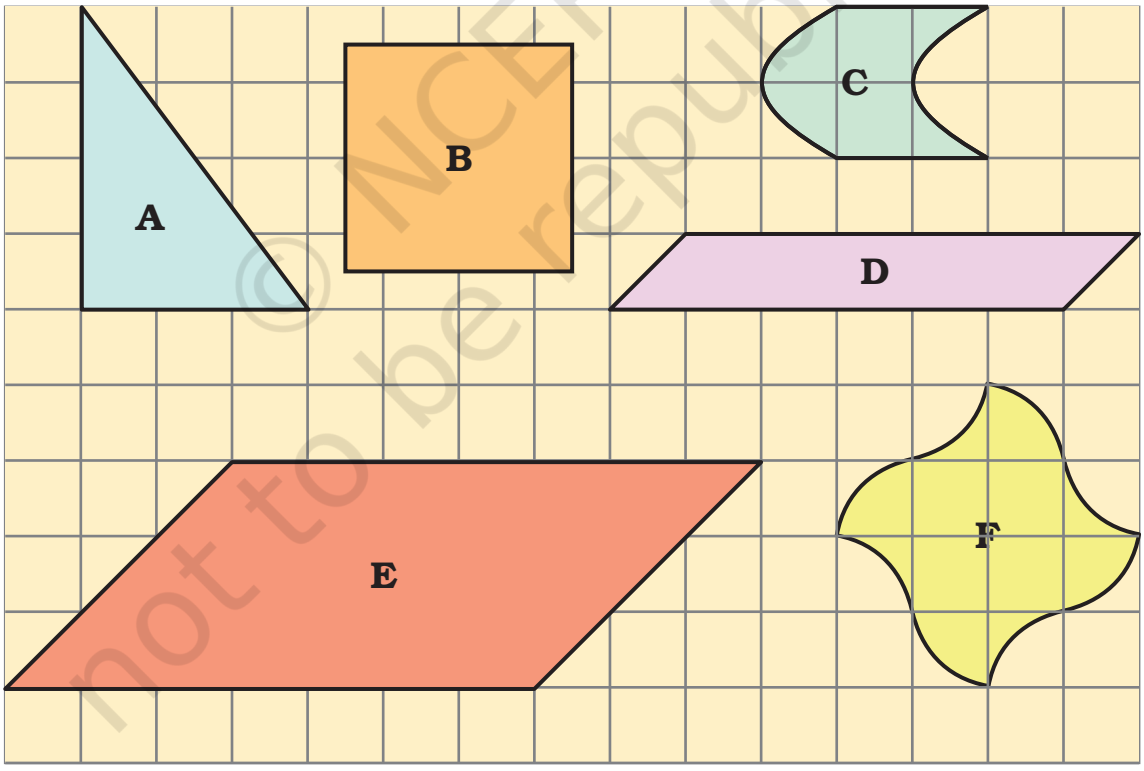
At this stage children need not count each square. Encourage them to identify the largest squares and rectangles within a footprint to know their area and then count small squares for irregular shapes. Though area of a rectangle will be done in chapter 11, some children may discover themselves that they can find the area faster through multiplication.

How Many Squares in Me?



❊ Write the area (in square cm) of the shapes below.



In this exercise children are expected to notice the geometrical symmetry of the shapes to find out their area. Encourage children to evolve their own strategies. Rounding off is not needed in these examples.

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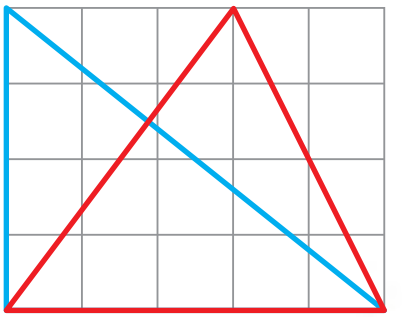
Try Triangles



Both the big triangles in this rectangle have the same area.

Sameena

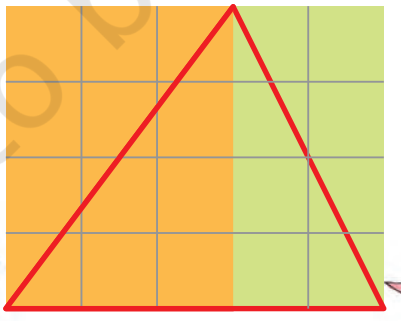
But these look very different.

Sadiq

The blue triangle is half of the big rectangle. Area of the big rectangle is 20 square cm. So the area of the blue triangle is _____ square cm.

And what about the red triangle?

Ah, in it there are two halves of two different rectangles!



Now you find the area of the two rectangles Sadiq is talking about. What is the area of the red triangle? Explain.

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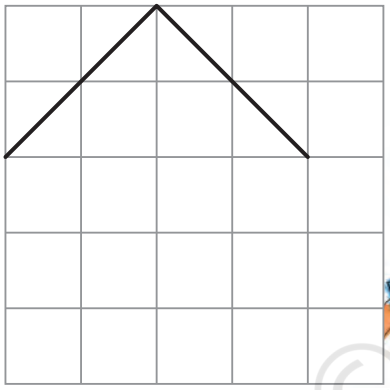
Yes you are right. And you know what!! You can draw many more triangles of area 10 square cm in this rectangle. Try drawing them.

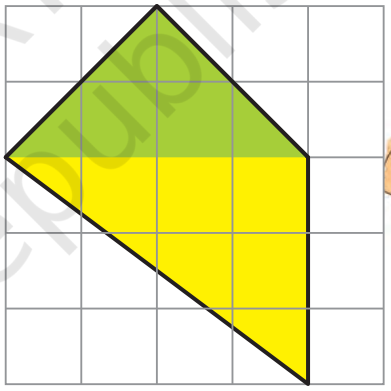
Help Sadiq in finding some more such triangles. Draw at least 5 more.

Complete the Shape

Suruchi drew two sides of a shape. She asked Asif to complete the shape with two more sides, so that its area is 10 square cm.



He completed the shape like this.



How did you do this?

Oh that's easy! If you look at the green area it is 4 square cm. Below it is the yellow area of 6 square cm. So the area of my shape is 10 square cm!

- Is he correct? Discuss.
- Explain how the green area is 4 square cm and the yellow area is 6 square cm.

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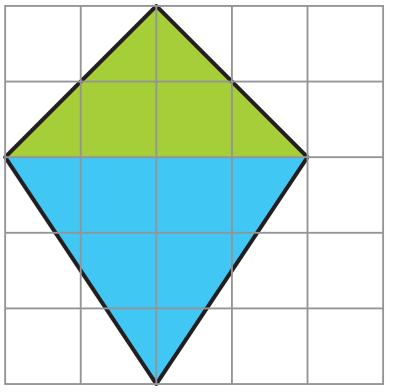
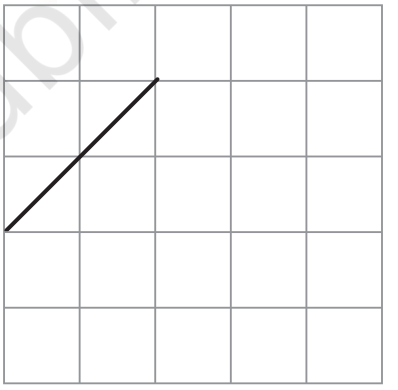
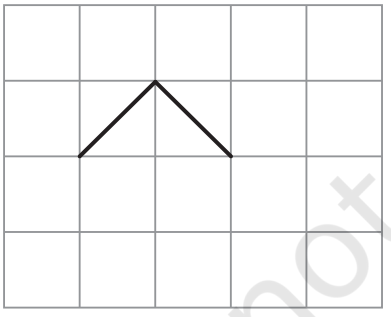


- Is Suruchi correct? How much is the blue area? Explain.
- Can you think of some other ways of completing the shape?
- Try some other ways yourself.
- Now ask your friends at home to solve these.

Practice time

1) This is one of the sides of a shape. Complete the shape so that its area is 4 square cm.





2) Two sides of a shape are drawn here. Complete the shape by drawing two more sides so that its area is less than 2 square cm.

Children can be encouraged to make shapes with either straight edges or curved edges to cover the given area. This exercise can be extended by asking children to draw on squared paper as many shapes as they can of a given area and making guesses for the largest or the smallest perimeter. They can also be asked to check their guesses by measuring the dimensions of the shapes. In case of curved edges, thread can be used for measuring the perimeter.

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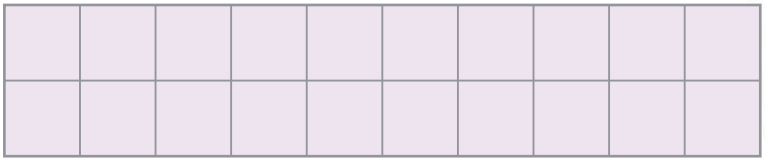
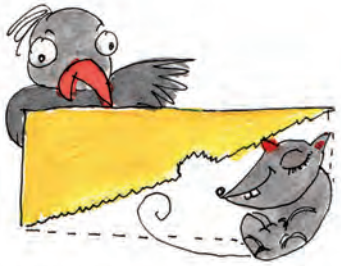
3) Here is a rectangle of area 20 square cm.



a) Draw one straight line in this rectangle to divide it into two equal triangles. What is the area of each of the triangles?

b) Draw one straight line in this rectangle to divide it into two equal rectangles. What is the area of each of the smaller rectangles?

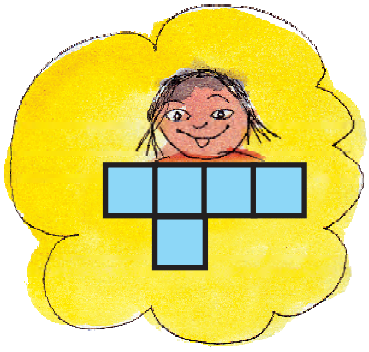
c) Draw two straight lines in this rectangle to divide it into one rectangle and two equal triangles.



- What is the area of the rectangle?
- What is the area of each of the triangles?

Puzzles with Five Squares

Measure the side of a small square on the squared paper on page 45. Make as many shapes as possible using 5 such squares. Three are drawn for you.



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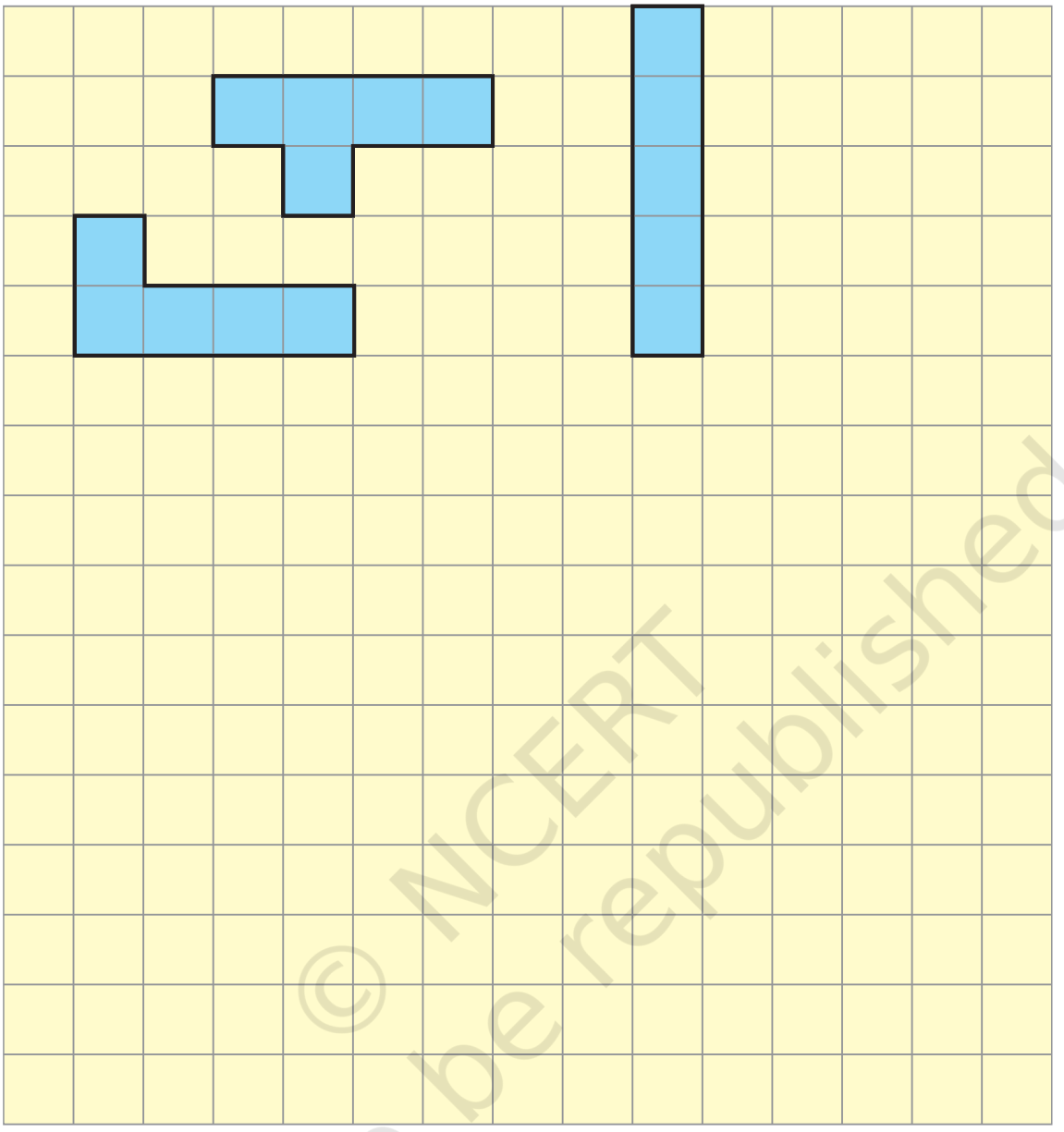
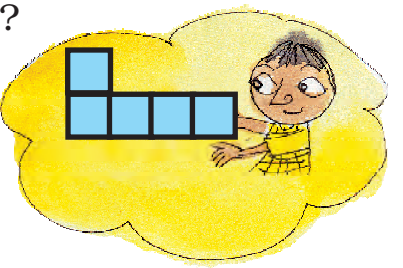


a) How many different shapes can you draw? _____

b) Which shape has the longest perimeter? How much? _____ cm

c) Which shape has the shortest perimeter? How much? _____ cm

d) What is the area of the shapes? _____ square cm. That's simple!



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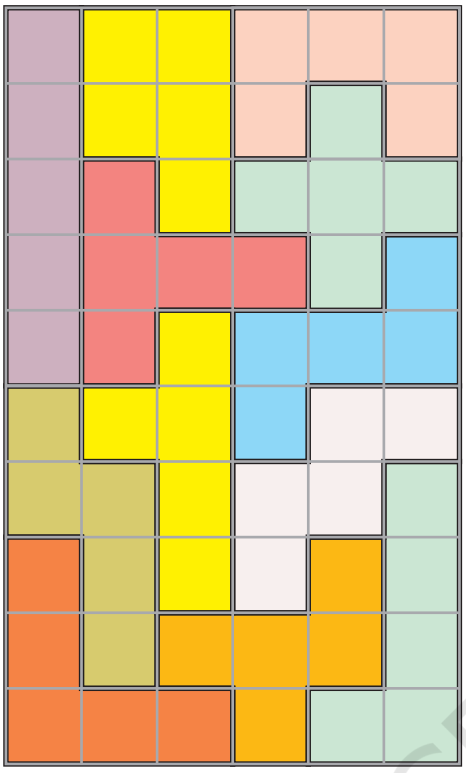
Did you get all the 12 shapes using 5 squares?



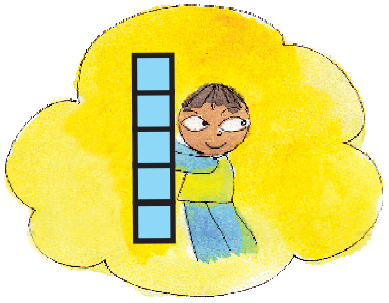
All 12 shapes are arranged here to make a rectangle.

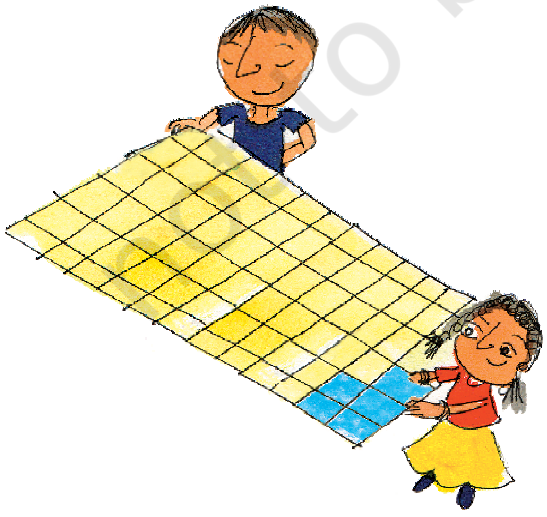
This is a 10 X 6 rectangle as there are 10 rows and 6 columns.

You will be surprised to know that there are more than 2000 ways in which these shapes make a 10 X 6 rectangle.

Draw all the 12 shapes on a sheet of cardboard and cut them.

Try to arrange your 12 shapes in some other way to make a 10×6 rectangle. Could you do it?





Try another puzzle

You have to make a 5×12 rectangle with these 12 shapes. There are more than 1000 ways to do it. If you can find even one, that's great!

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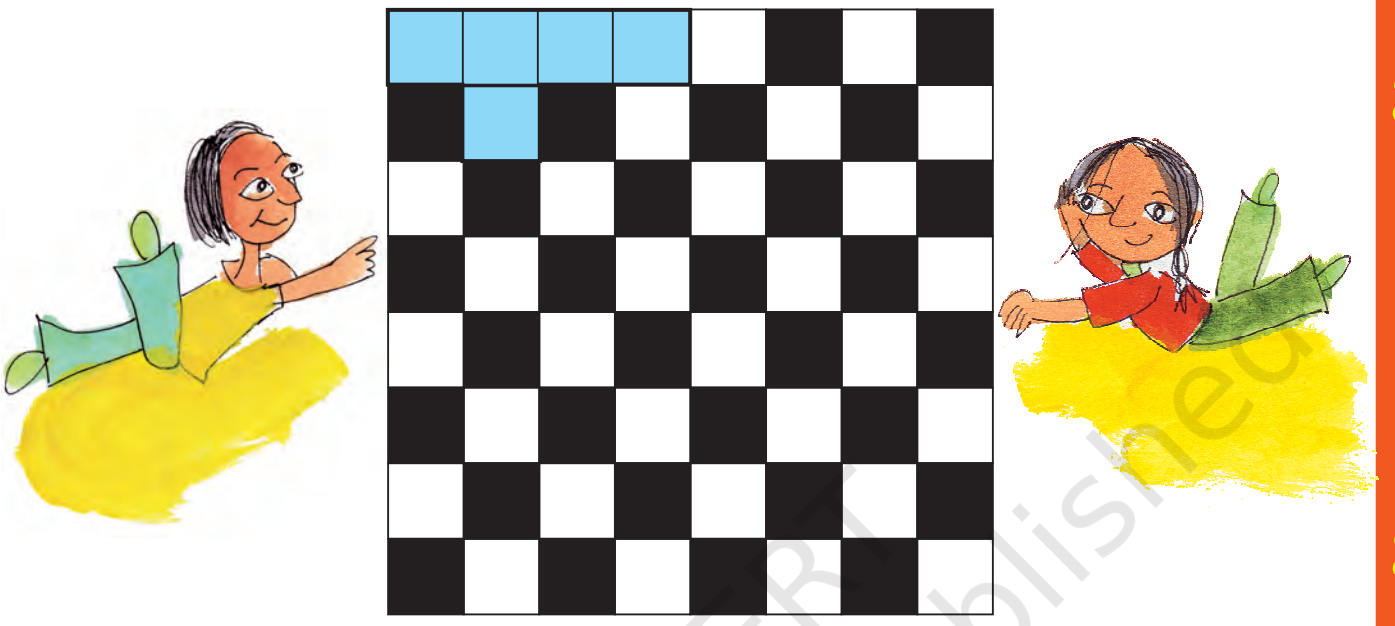
Game Time

Here is a chessboard. Play this game with your partner, with one set of 12 shapes.



The first player picks one shape from the set and puts it on the board covering any five squares.

The other player picks another shape and puts it on the board, but it must not overlap the first shape.

Keep taking turns until one of you can't go any further.

Whoever puts the last piece wins!

Make Your Own Tile

Remember the floor patterns in Math-Magic Book 4 (pages 117-119). You had to choose the correct tile which could be repeated to make a pattern so that there were no gaps left.

Encourage children to try to do these 'pentomino' puzzles at home. Such exercises can be designed for shapes with 6 squares (hexominoes) in which case there will be 35 different shapes possible.

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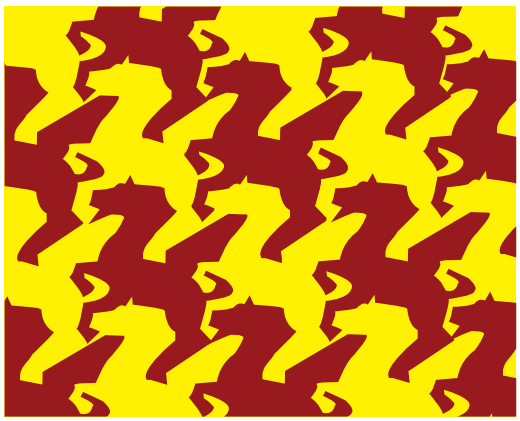
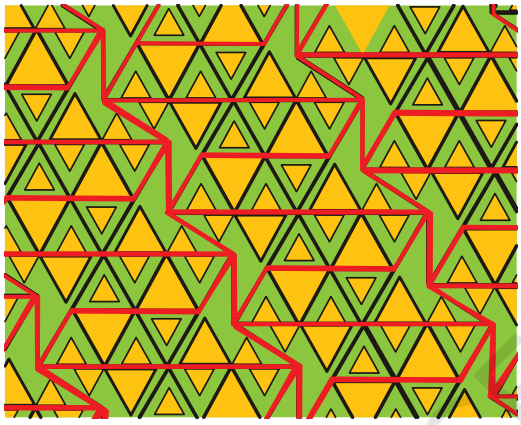
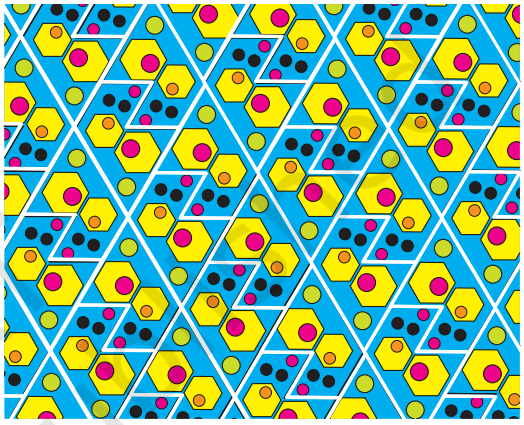
Ziri went to a shop and was surprised to see the different designs of tiles on the floor. Aren't these beautiful!



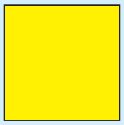
❊ Can you find the tile which is repeated to make each of these floor patterns? Circle a tile in each pattern.



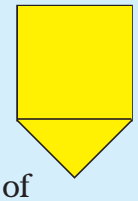


After looking at the patterns Ziri wanted to make her own yellow tile. You too make a tile this way.

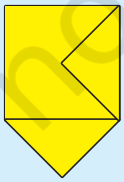
Step 1: Take a piece of cardboard or thick paper. Draw a square of side 3 cm on it.



Step 2: Draw a triangle on any one of the sides of this square.

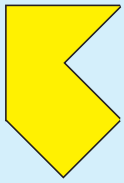


Step 3: Draw another triangle of the same size on another side of the square. But this time draw it inside the square.



Step 4: Cut this shape from the cardboard. Your tile is ready!

What is it's area?



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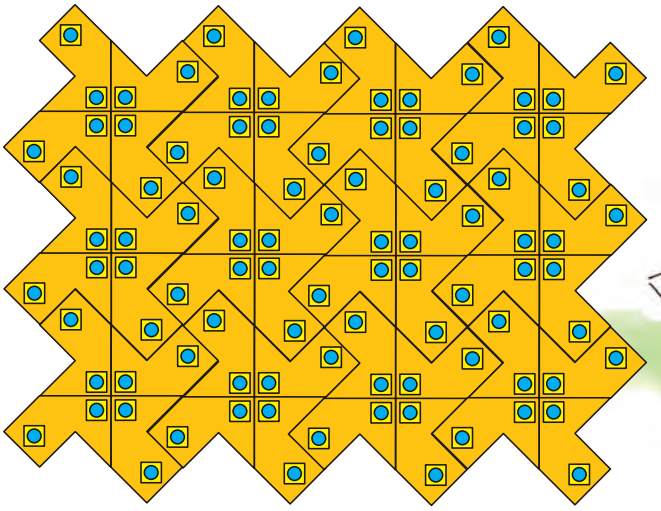
Make a pattern using your tile. Trace the shape to repeat it on a page, but remember there must be no gaps between them.

Ziri made a pattern using her yellow tiles.(You know the area of her tile.)

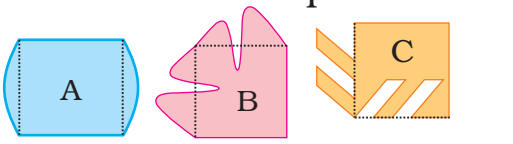


Answer these —

- How many tiles has she used?
- What is the area of the floor pattern Ziri has made here?

Practice time

Ziri tried to make some other tiles. She started with a square of 2 cm side and made shapes like these.



Look at these carefully and find out:

- Which of these shapes will tile a floor (without any gaps)? Discuss. What is the area of these shapes?
- Make designs in your copy by tiling those shapes.
- Now you create your own new tiles out of a square. Can you do the same with a triangle? Try doing it.

In Class III and IV basic shapes like squares, rectangles, hexagons, triangles, circles etc were used to examine which of those can tile and which do not tile to make floor patterns. Children must now be able to modify basic shapes to create different tiling shapes. In the exercise above they may create new shapes out of a square that do not tile even though their area remains the same as that of the square from which they are made.

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4 Parts and Wholes

0527CH04

Our Flag

You must have seen the flag of our country. Do you know how to draw the flag?

Draw a rectangle of length 9 cm and width 6 cm. Divide it into three equal parts and complete the flag.

The top one-third of our flag is saffron (or orange). What is the colour of the middle one-third of the flag? Where will you draw the Ashoka chakra?

How much of the flag will you colour green?

Is the white colour now less than $\frac{1}{3}$ of the flag? Why?

Now look at this flag. How much of it is black? _____

The flag of Afghanistan

The green part of the flag can be written as _____

Is red less than one-third of the flag? Why?

This is the flag of Myanmar, our neighbour.

Is blue more than one-fourth of the flag or less ?

Guess how much of the flag is red. Is it more than $\frac{1}{2}$? Is it more than three-fourths?

Because of the blue chakra in the white part of the Indian flag, the white colour is a little less than 1/3.There can be some discussion on this point.

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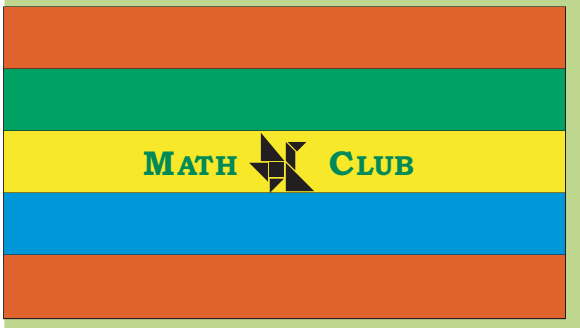
Find out

Collect as many flags as you can.

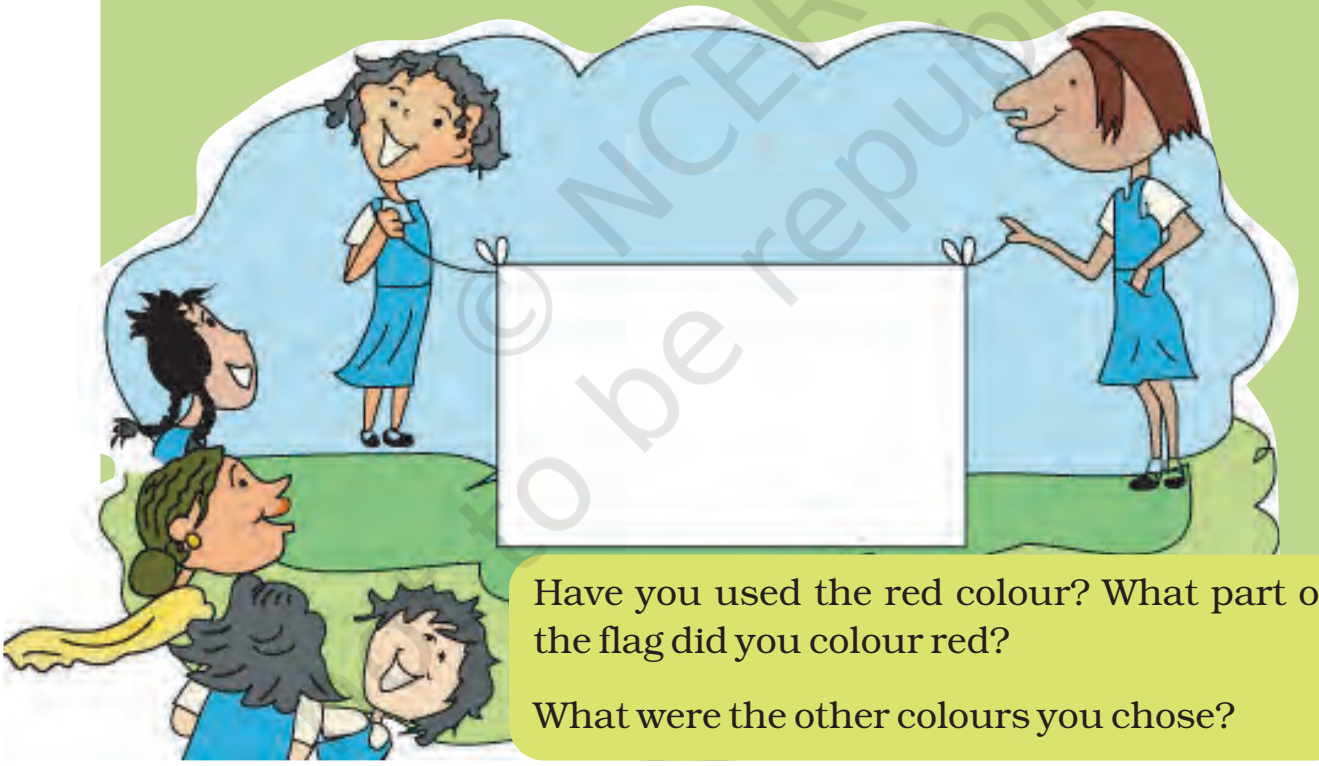
How many flags have three colours? Are all the coloured parts equal in these flags?

This is the flag of the Math Club in a school in Kerala. What part of the flag is coloured red? What part is green?



See this black logo. Draw it.

Is there a Math Club in your school? If not, ask your teacher how to set it up. Design a flag for your Math Club. Draw it here.



Have you used the red colour? What part of the flag did you colour red?

What were the other colours you chose?

Math Club can be set up in the school in which interesting activities can be taken up like making puzzles, shapes with tangrams, maps of buildings, looking for different geometrical shapes and angles in the environment, calculating area and perimeter of a school ground, etc.

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Magic Top

Let us make a magic top.

Take a cardboard piece.

Draw a circle of radius 3 cm and cut it out.

Divide the circle into 8 equal parts. Now each part is $\frac{1}{8}$ of the circle.

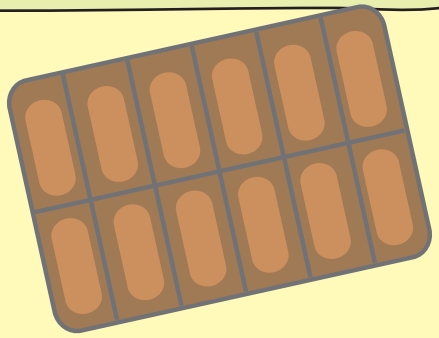
Colour $\frac{2}{8}$ red, $\frac{1}{8}$ orange, $\frac{1}{8}$ yellow etc. as shown here. Push a matchstick through the centre of the circle .

Your magic top is ready. Spin it fast!

What do you see? Can you see all the colours? Write what you see in your notebook.

Practice time

A) Chocolate bar



Manju had a chocolate. She gave one-fourth of it to Raji, one-third to Sugatha and one-sixth to Sheela. She ate the remaining part. How many pieces of chocolate did each get? Write here.

Raji

Sugatha

Sheela

Manju

What part of the chocolate did Manju eat?

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B) Colour the hats

Colour $\frac{1}{3}$ of the hats red.

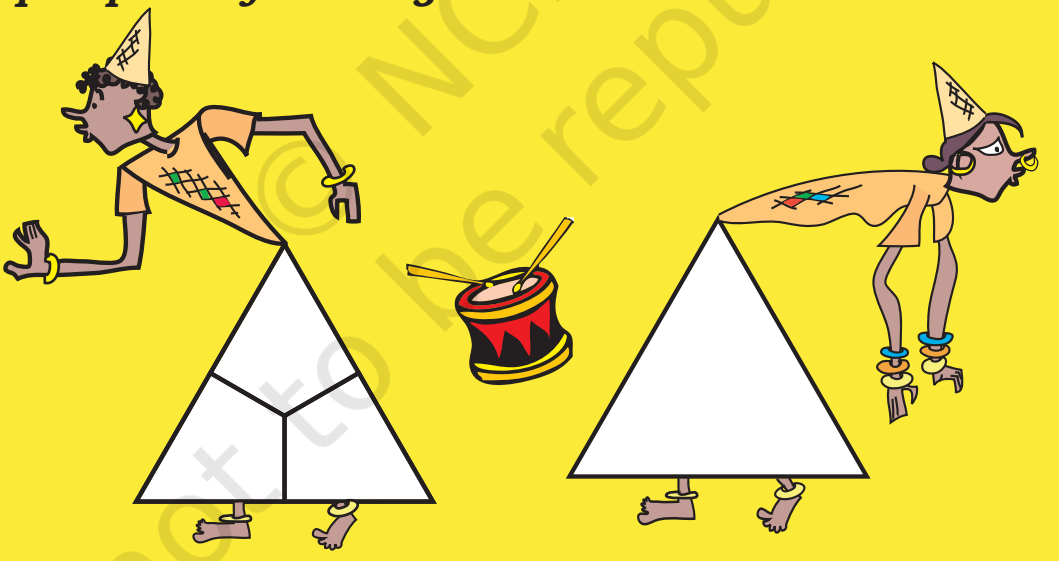
Colour three-fifth hats blue.

How many hats did you colour red?

How many hats did you colour blue?

What part of the hats are not coloured?

C) Equal parts of a triangle



The white triangle is divided into three equal parts. Fill each one-third part with a different colour. Can you show that these parts are equal? Think how.

Now try to make three equal parts of this triangle in a different way. Colour each one-third with a different colour.

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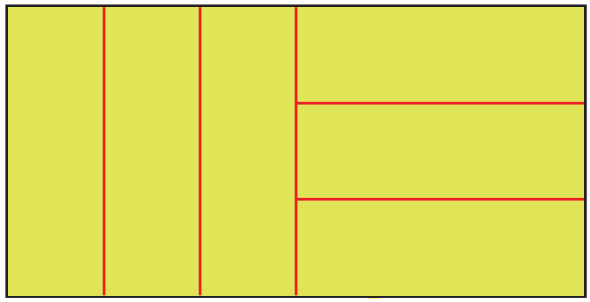
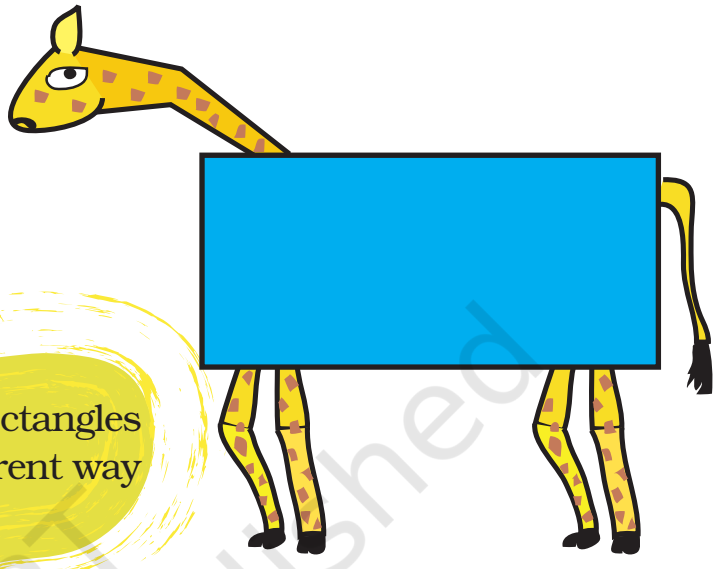
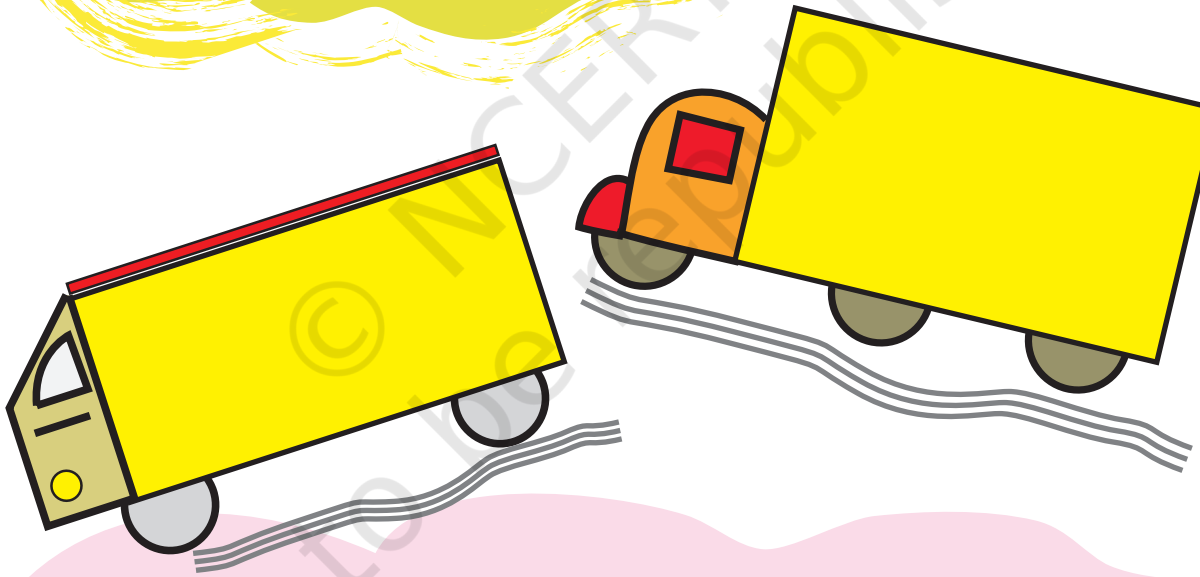
D) *Six parts of a rectangle*

Rani has divided a green rectangle into six equal parts like this.





❊ Now you divide each of these rectangles into six equal parts. Use a different way for each of the three rectangles.



Discuss

❊ How will you check that each part is really one-sixth of that rectangle?

❊ The green rectangle is bigger than the blue one. Can we say that $\frac{1}{6}$ of the green rectangle is bigger than $\frac{1}{6}$ of the blue rectangle?

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Greedy Gatekeepers

Remember Birbal, the clever minister of King Akbar? (Math Magic Class IV, page 14) Do you know how he became a minister?

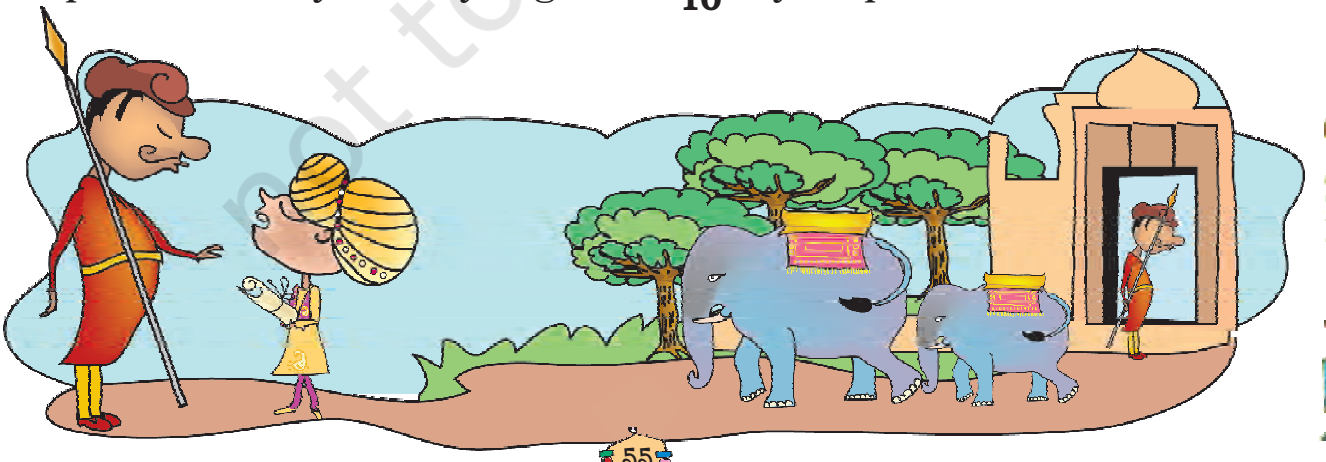
Birbal was then a young boy living in a village. He was very clever and could write poetry.

He thought he would try his luck in the King's court. So he took some of his poems and set off for the city.

When he reached the outer gate of the palace, he was stopped by the gatekeeper. "Hey! Stop there! Where are you going?", shouted the gatekeeper.

"I am a poet. I want to see King Akbar and show my poems to him", replied the poet.

"Oh, you are a poet! The king is kind, he will surely give you a prize. I will let you in if you give me $\frac{1}{10}$ of your prize".



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Young Birbal agreed since he had no other way.

When he went in, the gatekeeper calculated "If he gets 100 gold coins I will get _____ gold coins".

The poet came to a second gatekeeper.

This gatekeeper also said, "I will let you in if you give me **two-fifth** of your prize". The poet agreed.

The gatekeeper happily calculated, "The poet will get at least 100 gold coins so I will get _____ gold coins!"

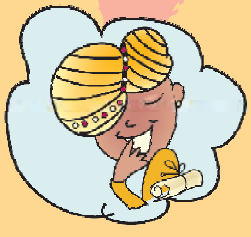
The poet reached the last gate. The gatekeeper said, "I will allow you to see the king only if you give me **half** of the prize that you get". The poet had no other way. He agreed and went inside.

The gatekeeper thought, "Today is a great day. If he gets 100 gold coins I will get _____ gold coins. But if he gets 1000 coins — wow! I will get _____".

The king was very happy with the poems and said, "Your work is very good. You can ask anything as your prize".

"My Lord, I want 100 slaps". "What! 100 slaps? _____". The king was shocked —

* What happened after that? Complete the story. What part of the prize did the poet get?



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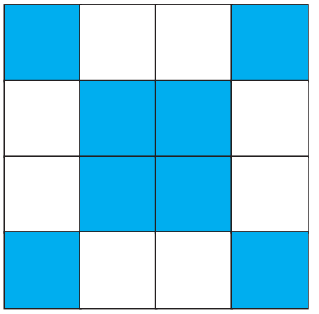
Patterns in Parts

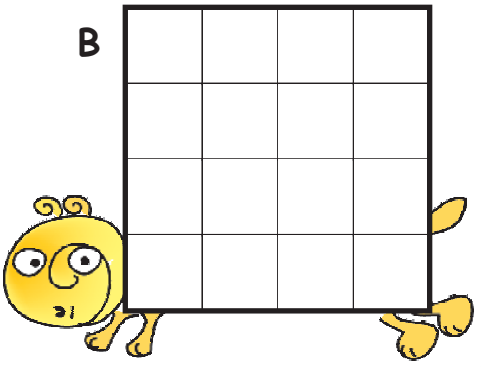
1) Make different patterns by colouring some squares in the grids B, C, D. What part of the grid did you colour? What part of the grid remained white? Write.

A

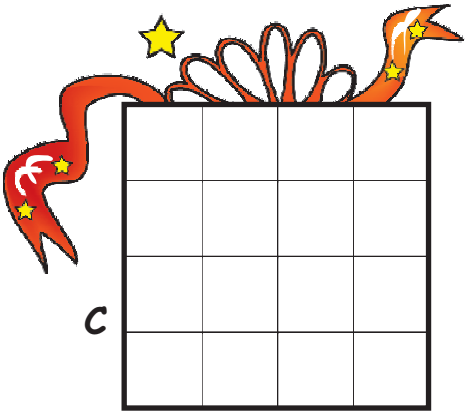


$\frac{8}{16}$ blue, $\frac{8}{16}$ white

B



C



D

2) Look at grid A again. Is the grid coloured —

a) $\frac{1}{2}$ blue, $\frac{1}{2}$ white?

b) $\frac{2}{4}$ blue , $\frac{2}{4}$ white?

c) $\frac{3}{8}$ blue, $\frac{5}{8}$ white?

d) $\frac{4}{8}$ blue, $\frac{4}{8}$white?

Mark (×) on the wrong answer.

3) Draw grids of 16 squares and make patterns with

a) $\frac{2}{8}$ red, $\frac{1}{2}$ yellow, $\frac{1}{4}$ green

b) $\frac{3}{16}$ blue, $\frac{5}{16}$ red, $\frac{1}{2}$ yellow

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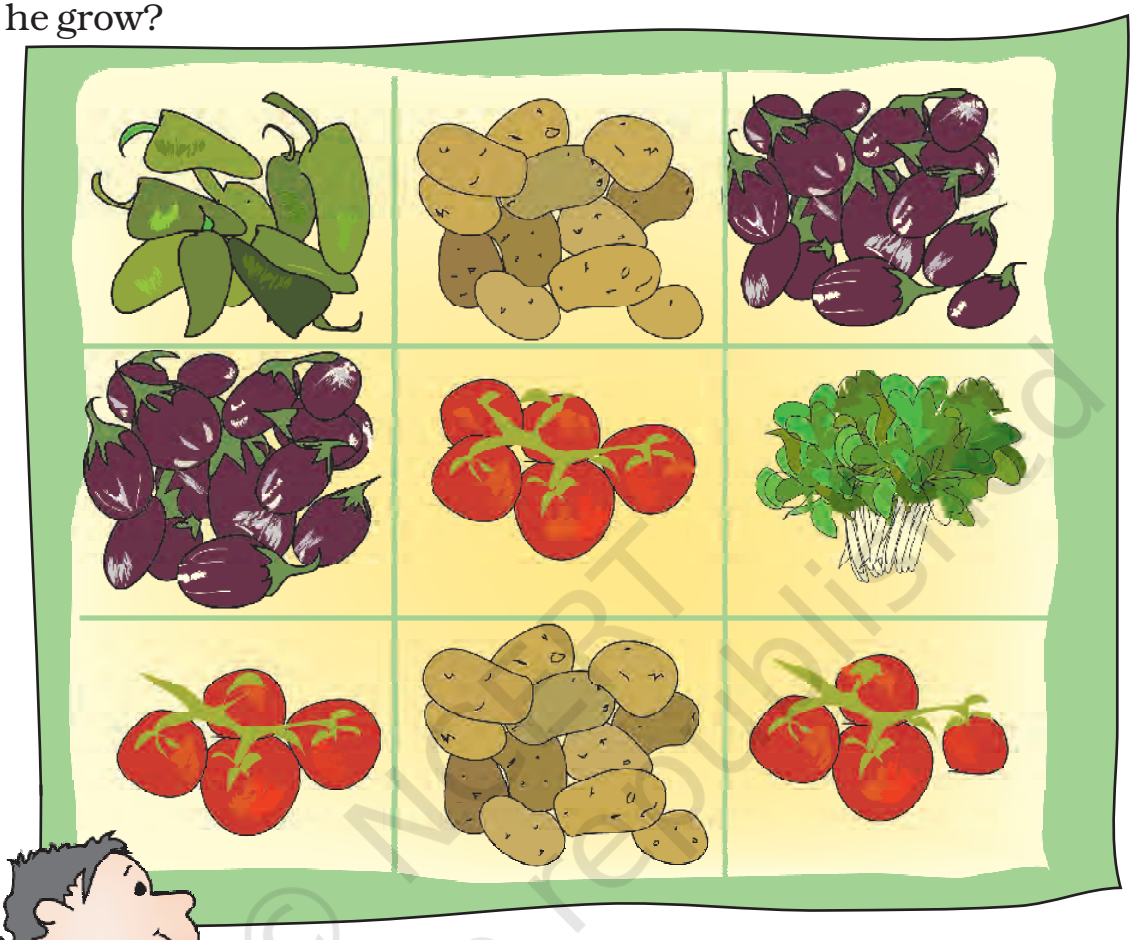
Ramu's Vegetable Field

Ramu's vegetable field has 9 equal parts. What vegetables does he grow?



1) Which vegetable grows in the biggest part of his field? What part?

2) On what part of the field does he grow potatoes?

3) What part of the field is used to grow spinach? What part is used for brinjals?

4) Now you write some questions by looking at this picture.

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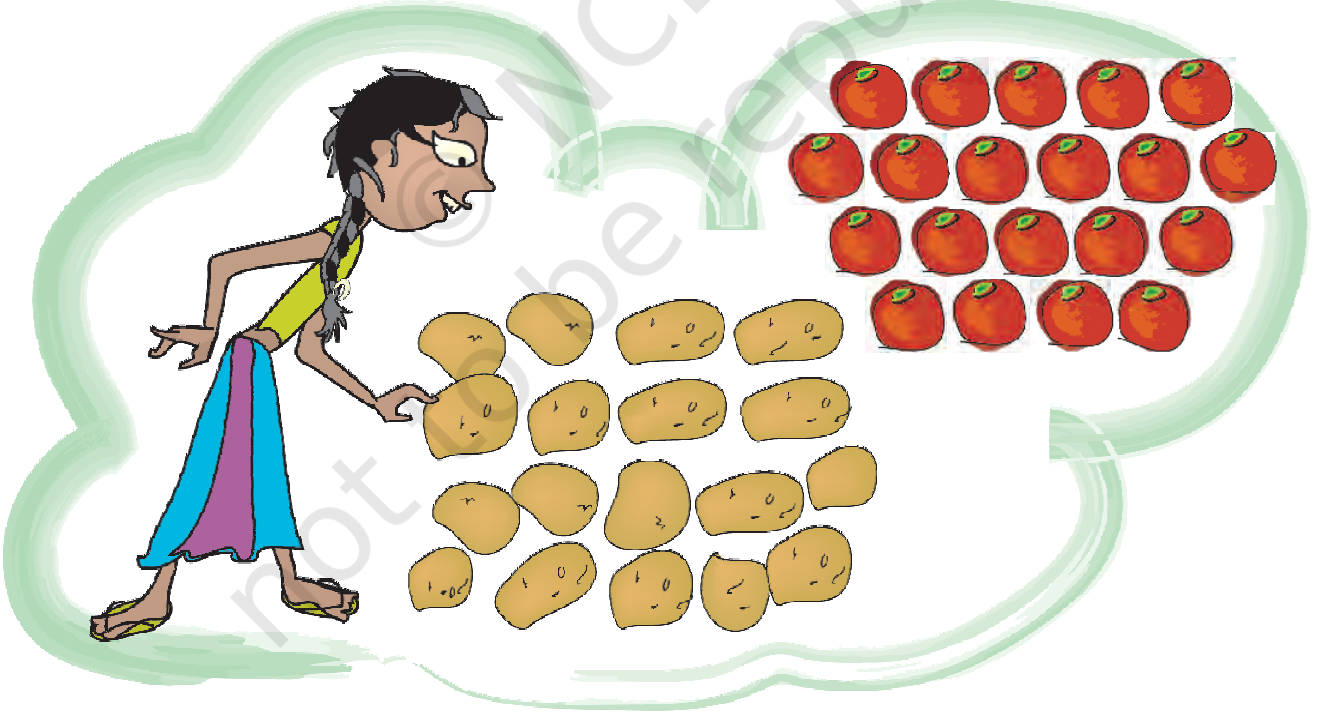
❊ Ramu wanted to give these vegetables to his friends. He gave Aboobacker one-fifth of these tomatoes and $\frac{1}{3}$ of the potatoes. Srija got $\frac{2}{5}$ of the tomatoes and $\frac{3}{6}$ of the potatoes. Nancy got the rest of these vegetables. Circle Aboobacker's share in blue. Circle Srija's share in yellow.



❊ How many potatoes and tomatoes did Nancy get?

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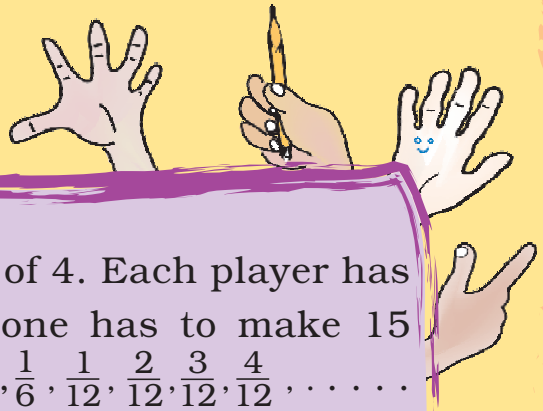
Game: Who Colours the Circle First?

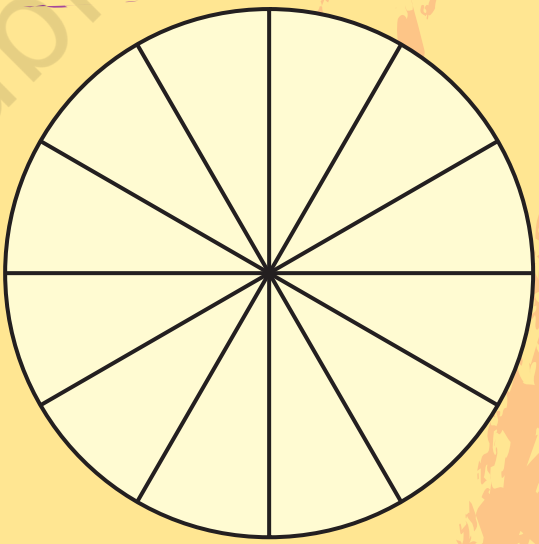


This game is to be played in groups of 4. Each player has to make a circle as shown. Each one has to make 15 tokens on slips of paper. Write $\frac{1}{2}, \frac{1}{3}, \frac{1}{4}, \frac{1}{6}, \frac{1}{12}, \frac{2}{12}, \frac{3}{12}, \frac{4}{12}, \ldots\ldots \frac{11}{12}$ to make your tokens.

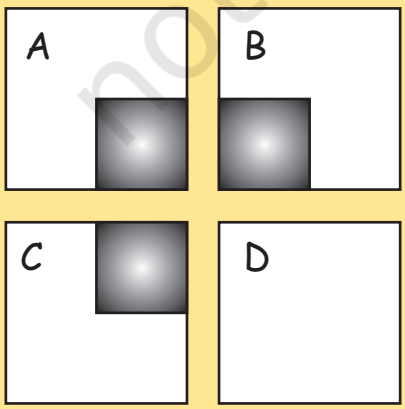
Shuffle the tokens and make a pile in the middle of the group. Now you are ready to start the game.

The first player takes a token from the pile, colours that part of the picture, and puts the token under the pile. The next player does the same, and so on. The winner is the one who first colours the circle completely.

- Who won the game?
- What are the winner's tokens?
- Write the tokens you got.
- What part of the circle did you colour?



The Card Puzzle



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1) *Divide the white area in square A into two equal parts.*

Got the answer? Was that easy?

Now do the second question.

2) *Divide the white area in square B into three equal parts!*

That too is easy, isn't it?

Now see the third question.

3) *Divide the white area in square C into four equal parts!!*

Is it a bit difficult? Don't worry, take your time.

Only if you have given up, look for the answer.

Here comes the last question .

4) *Divide the white area in square D into seven equal parts!!!!*

The world record for this is 7 seconds. But you can take minutes!

Tired of thinking? Look for the answer on page 68.

So was that difficult??

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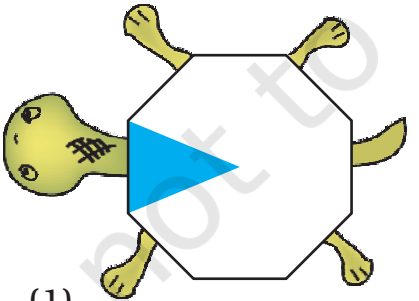
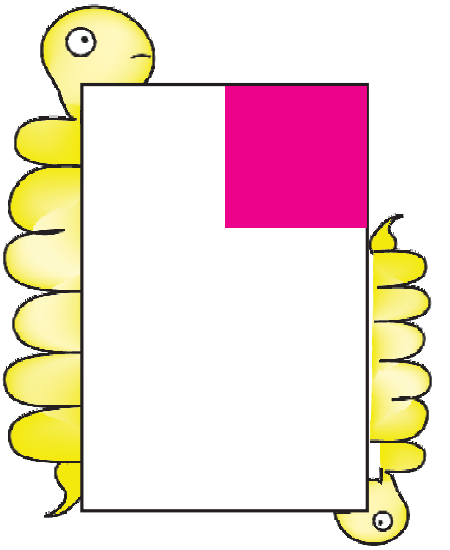
Guess and Check

A) What part of each shape is coloured?

First guess the answer, then check.



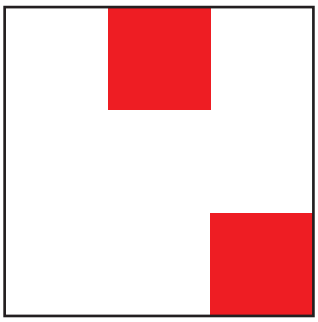
(1)



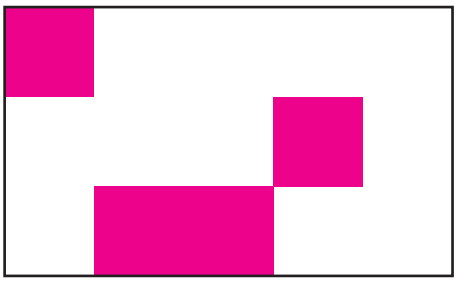
(2)

The colouring circle game and many more such activities should be done in class. The follow-up discussions for all these activities will play a major role in developing children's conceptual understanding about fractions.

(3)

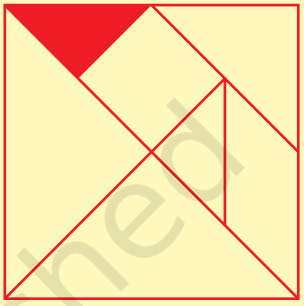


(4)



B) Do you remember this picture? Look at the small triangle. What part of the square is it? How will you find this out?

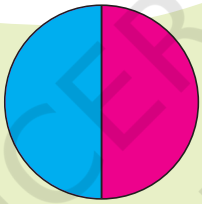
Divide the big triangles and other shapes into small triangles (like the red one). How many small triangles are there altogether?



Coloured Parts

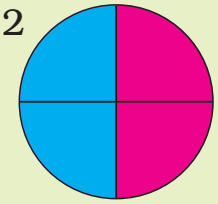
Complete these

1



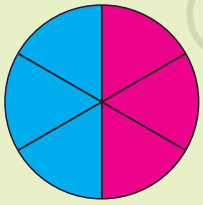
This circle is divided into two equal parts. Out of _____ equal parts one part is coloured blue.

2



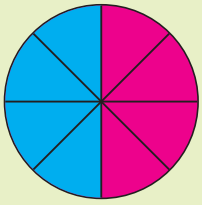
Here the circle is divided into _____ equal parts. Out of _____ equal parts, _____ parts are coloured blue.

3



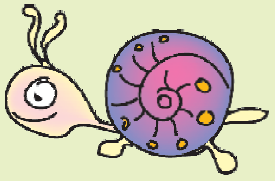
Here the circle is .....
.....
.....
.....

4



Here the circle is .....
.....
.....
.....

So we can say that $\frac{1}{2} = \frac{2}{....} = \frac{....}{6} = \frac{....}{8}$



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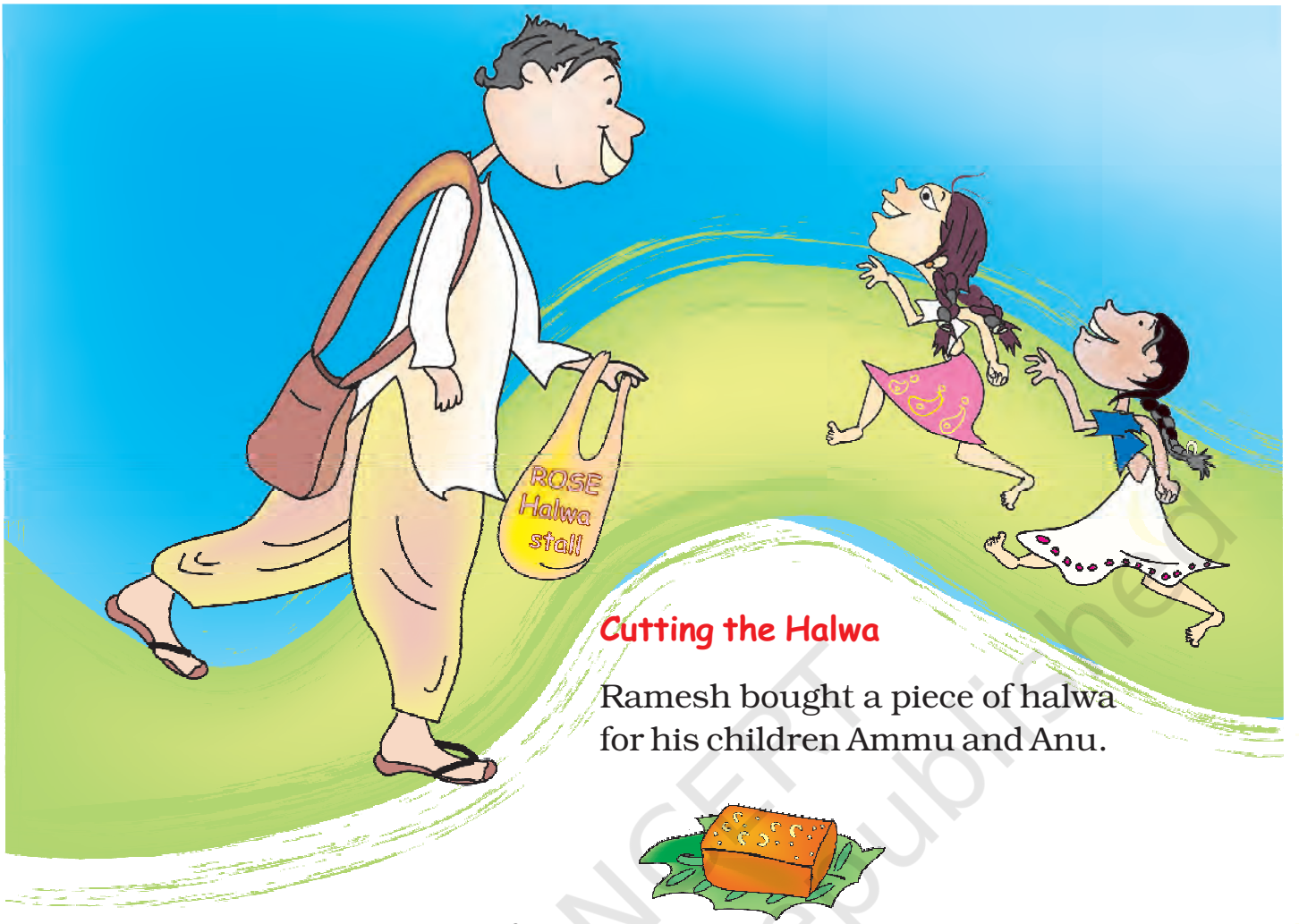
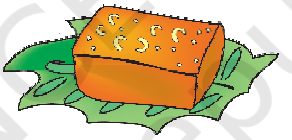


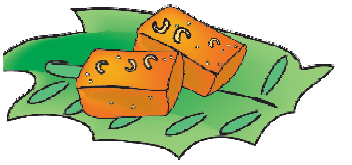
Cutting the Halwa

Ramesh bought a piece of halwa for his children Ammu and Anu.



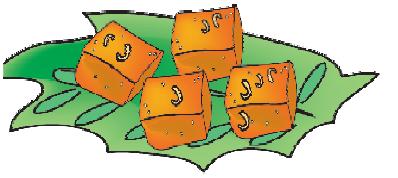
He divided it equally for them.

❊ Each will get _____ part of halwa.



"This piece is too big. We can't eat it", they said.

So he divided the pieces into half again. Now how many pieces will Ammu get? _____

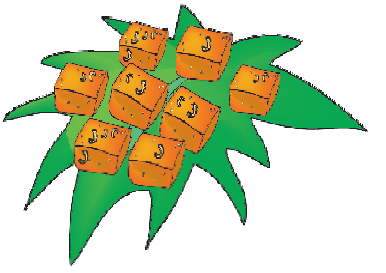


❊ What part of the halwa is it? _____

"Make it even smaller, Dad" they asked.

So he again cut the halwa into smaller pieces.

"Ok, thank you, Dad."



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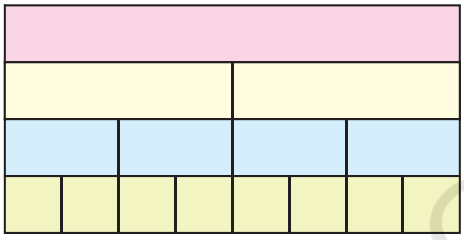
- Now how many pieces will each get?
- What part of the halwa is each piece now?
- If Ramesh had cut the halwa into 6 equal parts how many pieces would each have got? Look at your answers for questions 1 to 4 and write —

$\frac{1}{2}$ = ___ = ___ = ___ = ___ = ___

Parts of the Strip

Look at the picture. Write what part of the strip is each green piece. Write the part for a piece of each colour.



How many one-fourths will make a half?

How many $\frac{1}{8}$ will make $\frac{1}{4}$?

How many $\frac{1}{8}$ are in $\frac{1}{2}$?

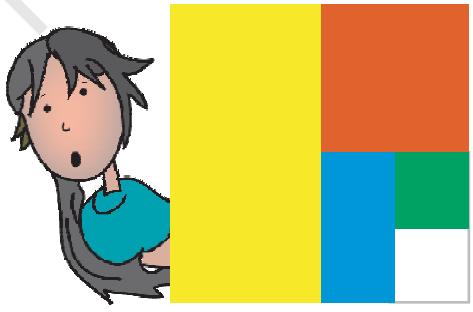
Now ask your friends some questions on the same picture.

Patterns

Look at this square.

What part is coloured blue?

What part is green?



Puzzle: Is it Equal?

Ammini says half of half and one-third of three-quarters are equal. Do you agree? How will you show this?

The use of concrete things (such as matchsticks, bottle caps etc.) will help children make sense of equivalent fractions such as $\frac{1}{2} = \frac{2}{4} = \frac{3}{6} = \frac{4}{8} = \frac{5}{10}$. Children must make their own fraction strips using papers of different sizes. Encourage them to compare the strips by colouring them into different fractions.

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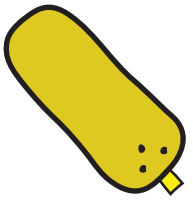
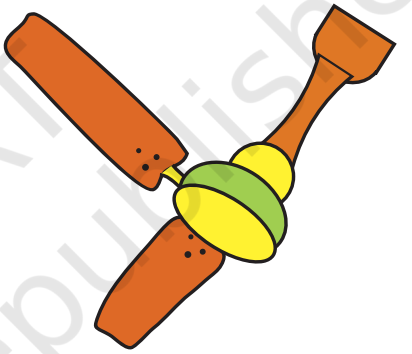
From a Part to the Whole

1) This show $\frac{1}{5}$ petals of a flower. Complete the flower by drawing the other petals.



2) The picture shows one-third of the blades of a fan. Complete the picture by drawing the other blades.

3) Half of the blades of another fan are shown here. Complete the picture by drawing the other half. How many blades have you drawn?



Rupees and Paise

How many will make one rupee?

Is 50 paise half of one rupee?

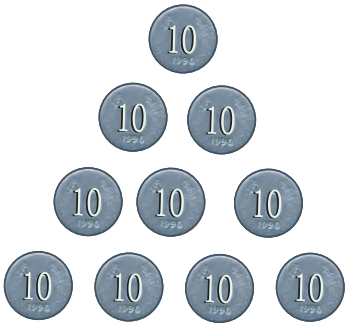
How many will make one rupee?

25 paise is _____ part of one rupee

20 paise is _____ part of one rupee

How many 10 paise will make one rupee?

So 10 paise is _____ part of one rupee.



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An Old Woman's Will

Once there lived an old woman. She lived with her three daughters. She was quite rich and had 19 camels. One day she fell ill. The daughters called the doctor. The doctor tried his best but could not save the woman. After her death, the daughters read what she had written in her will.

My eldest daughter will get $\frac{1}{2}$ of my camels
My second daughter will get $\frac{1}{4}$ of my camels
My third daughter will get $\frac{1}{5}$ of my camels

The daughters were really puzzled. "How can I get $\frac{1}{2}$ of the 19 camels?" asked the eldest daughter.

"Half of 19 is nine and a half. But we can't cut the camel!" The second daughter said.

"That is right. But what will we do now?" asked the third daughter".

Just then they saw their aunt coming. The daughters told her their problem.

"Show me the will. I have an idea. You take my camel. So you have 20 camels. Now can you divide them as your mother wanted?" the aunt said.

"You want half of the camels, don't you? Take 10 camels" she said to the eldest daughter.

"Take your share", the aunt told the second daughter. She took one-fourth of the camels and got _____ camels.

"You can take one-fifth of the camels", the aunt told the third daughter. She got _____ camels. The daughters were very happy and counted their camels 10+ _____ + _____ =19.

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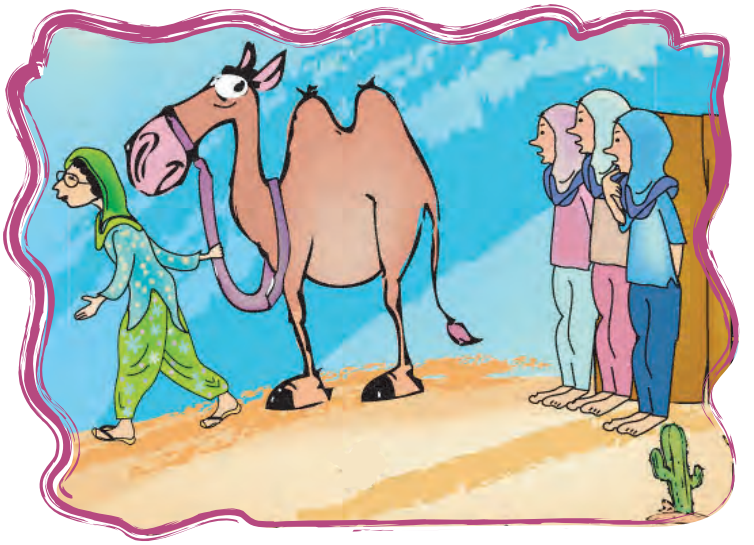
"The one remaining is mine", said the aunt and took her camel away!



❊ How did this happen? Discuss.

Arun's Time Table

Sleeping: One third of a day

Use different colours to show

Playing: One eighth of a day

Studying: $\frac{1}{4}$ of a day

How many hours does Arun take for

Sleeping? ☐ hours

Studying? ☐ hours

Playing? ☐ hours

What part of the day does he use for other activities?

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School Magazine

A school has decided to bring out a magazine every quarter of the year. How many magazines will they have in a year? If they want to print it at the end of each quarter of a year, which are the months for printing? Mark the number for those months.

1	2	3	4	5	6	7	8	9	10	11	12

Sleeping Beauty!

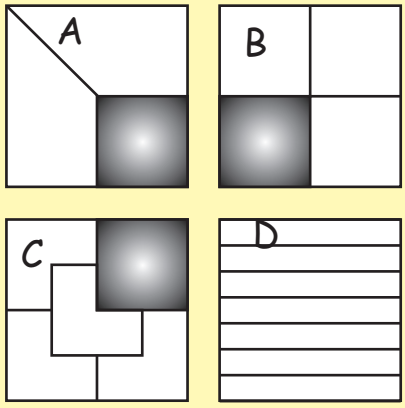
Have you heard of Kumbhakarna, the brother of Ravana? He is famous for sleeping for half a year.

Most people sleep about 8 hours a day. Then what part of a day is it? _____

So what part of a year do they sleep? A person 60 years old must have slept _____ years!!!

Answer: Card Puzzle (page 61)

Did you get stuck on square D? Actually that was the easiest!!



Children should be encouraged to think of what part of a day they spend in different activities. They should be sensitive about those children who have to spend a large part of the day working or helping at home. They should also be encouraged to think about parts of a year.

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Keerti's Shopping List

Look at the yellow price list.

a) How much does 2 kg of tomato cost?

b) How much does $\frac{1}{2}$ kg of tomato cost?

c) Kiran wants $2\frac{1}{2}$ kg of tomato. How much will it cost?

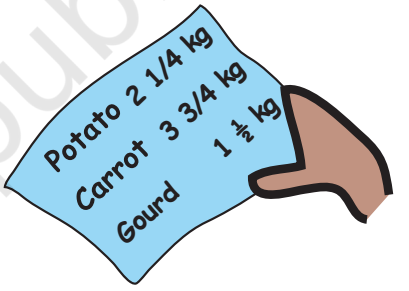
d) How much does $3\frac{1}{2}$ kg potato cost?

e) What is the price of $1\frac{1}{4}$ kg of carrot?

f) He bought a gourd of weight $4\frac{3}{4}$ kg and it costs _____

g) Look at the shopping list in Keerti's hand. How much will she have to pay to buy all of these?

h) Make a bill of your own for vegetables you want to buy. Find the total money you will have to pay.



Item	*Price in ₹ (per kg)*	*Quantity*	*Amount*
		Total	

Children should be encouraged to bring samples of real price lists and bills to discuss in the classroom.

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Reprint 2024-25

Practice time

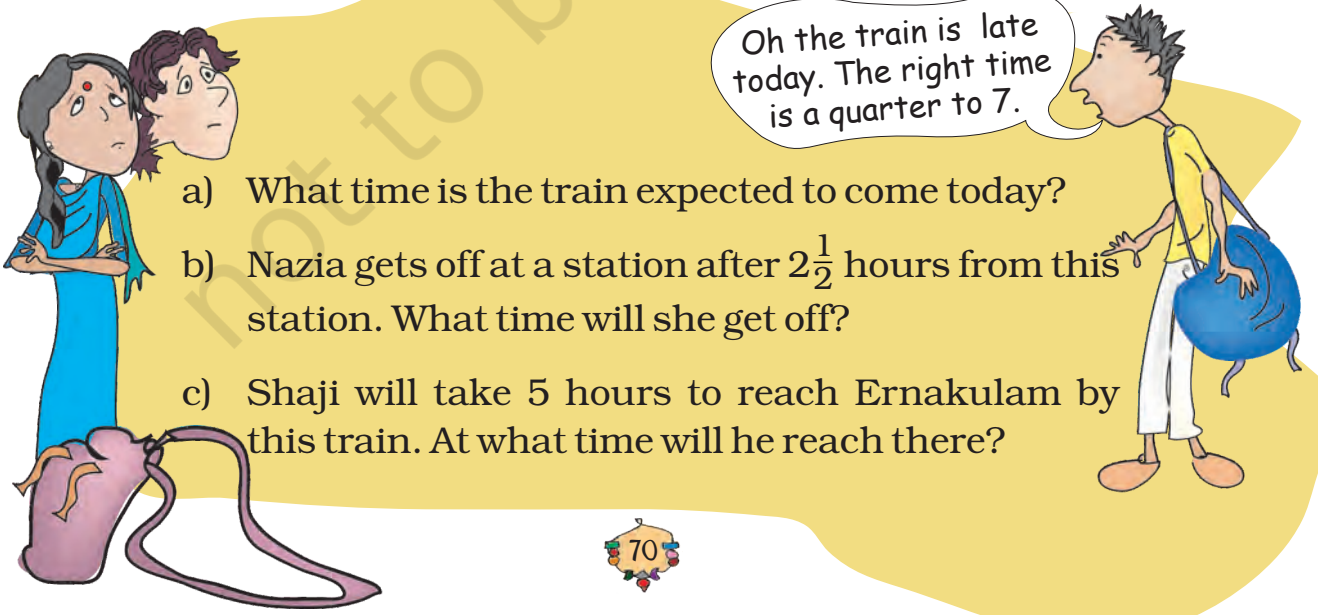
1) Raheem's journey

Raheem has to travel $1\frac{1}{4}$ km to reach school. What distance does he travel to go to school and come back home?

2) What coins?

Latha bought a pencil and a pen for seven and a half rupees. She gave ₹ 10/–. The shopkeeper gave back the money in half and quarter rupees. What are the coins she got?

3) At the railway station



a) What time is the train expected to come today?

b) Nazia gets off at a station after $2\frac{1}{2}$ hours from this station. What time will she get off?

c) Shaji will take 5 hours to reach Ernakulam by this train. At what time will he reach there?

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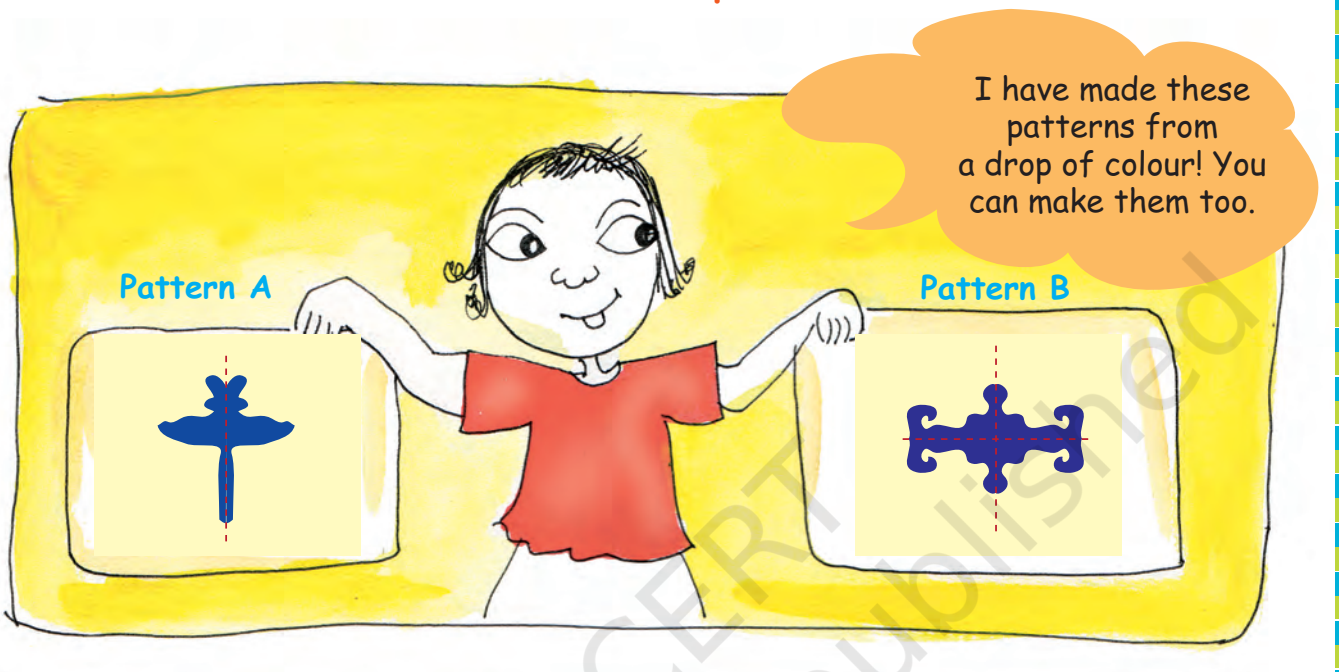
5 Does it Look the Same?

0527CH05

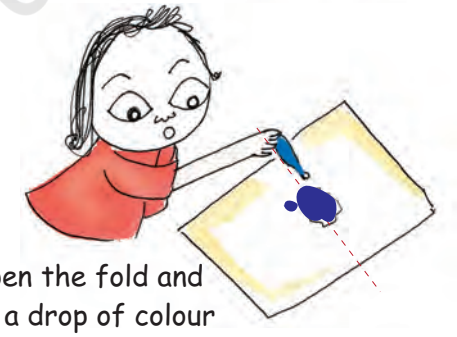
Let's Make Patterns From a Drop of Colour



Make your pattern

Take a sheet of paper

Fold it into half



Open the fold and put a drop of colour on the middle line

Fold it twice and press it to spread the colour

Open it and see a beautiful pattern

Can you cut this pattern in such a way that you get two similar mirror halves? In how many ways can you do it?

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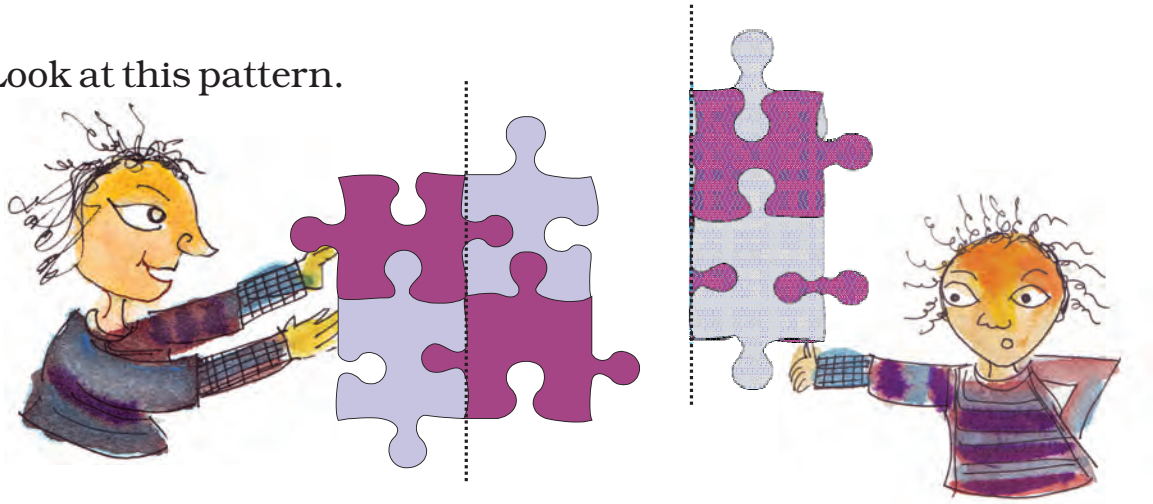
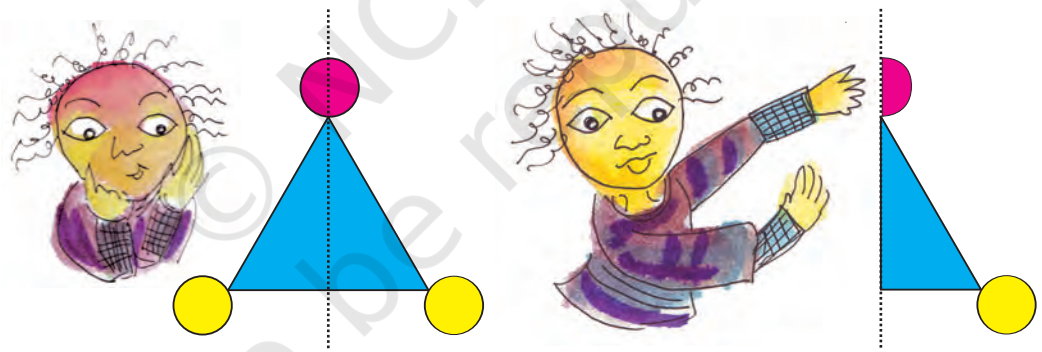
Look at this pattern.



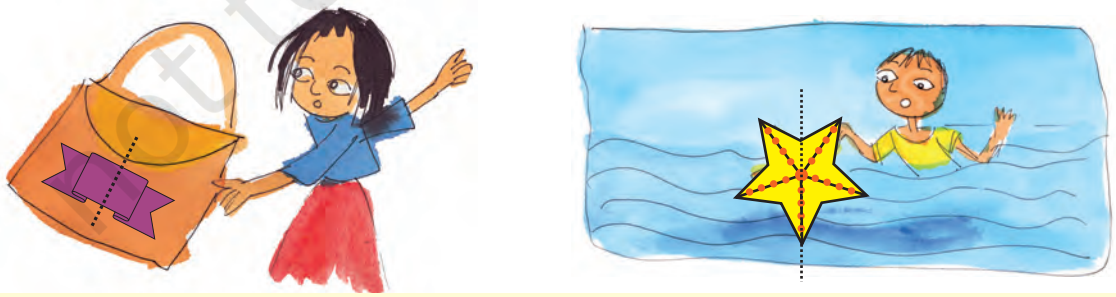
The dotted line divides the shape into two halves. But if you fold it along the dotted line, the left half does not cover the right half completely. So the two halves are not mirror halves.

Now look at another shape.

If you fold it along the dotted line, one half will cover the other similar half completely. So the two here are mirror halves.



Now imagine the same for these pictures.



On the next page, children need to understand that even though the shape is symmetric, the colour scheme of the figure can make it asymmetric (e.g. in shapes 10 and 12). Encourage children to look for asymmetry based on the shape as well as the colour scheme.

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✻ Which shapes are divided into two mirror halves by the dotted line?

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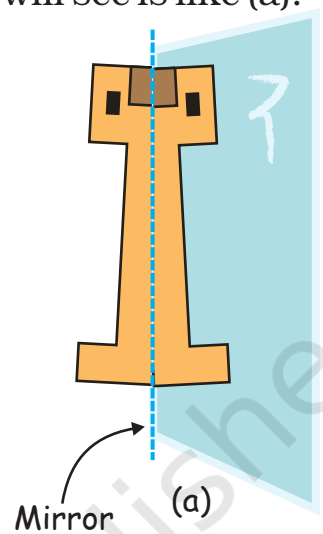
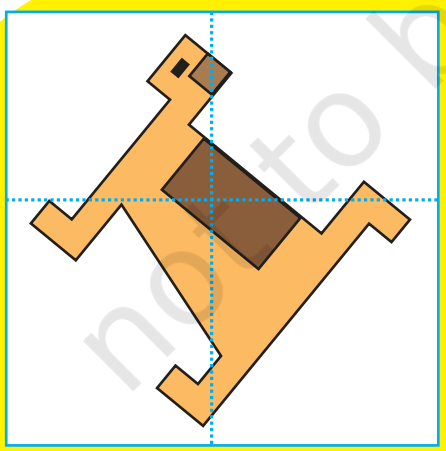
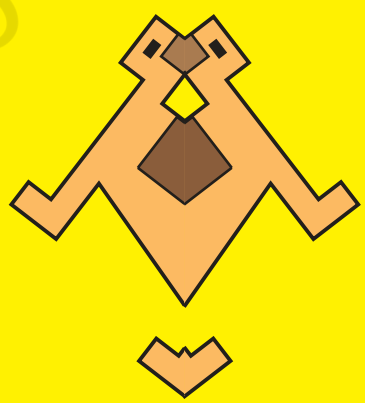
Mirror Games

1. Here is a picture of a dog. You can place a mirror on the dotted line. Then the part of the dog to the right of the line will be hidden behind the mirror. What you will see is like (a).



Look at the figure in the white box. On which of the dotted lines will you keep the mirror so that you get shape (b)? Also tell which part of the picture will be hidden when we keep the mirror on the dotted line.





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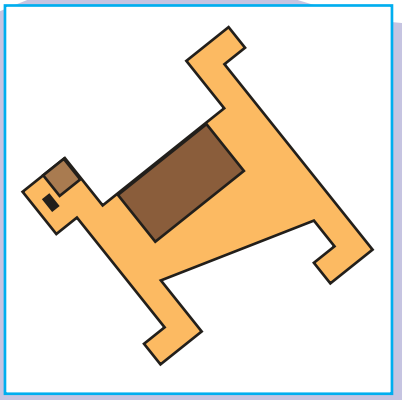
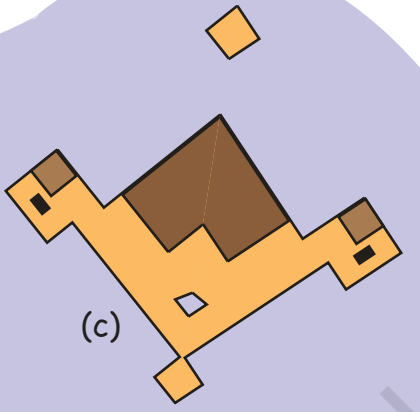
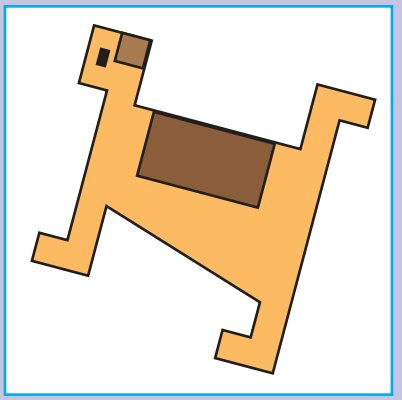
Now make a line on the white box to show where you will keep the mirror to get the picture next to it.

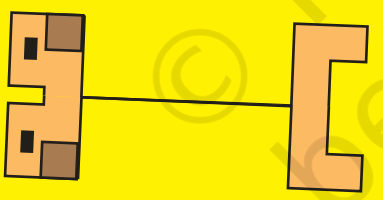




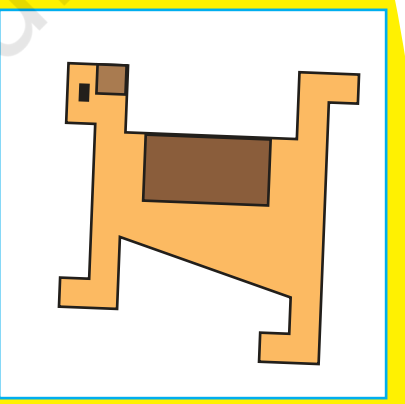
(c)

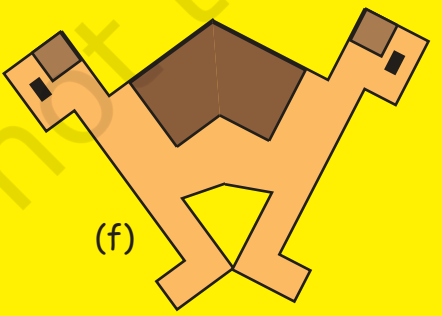


(d)

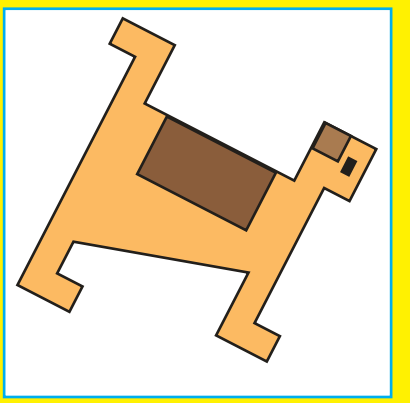


(e)





(f)



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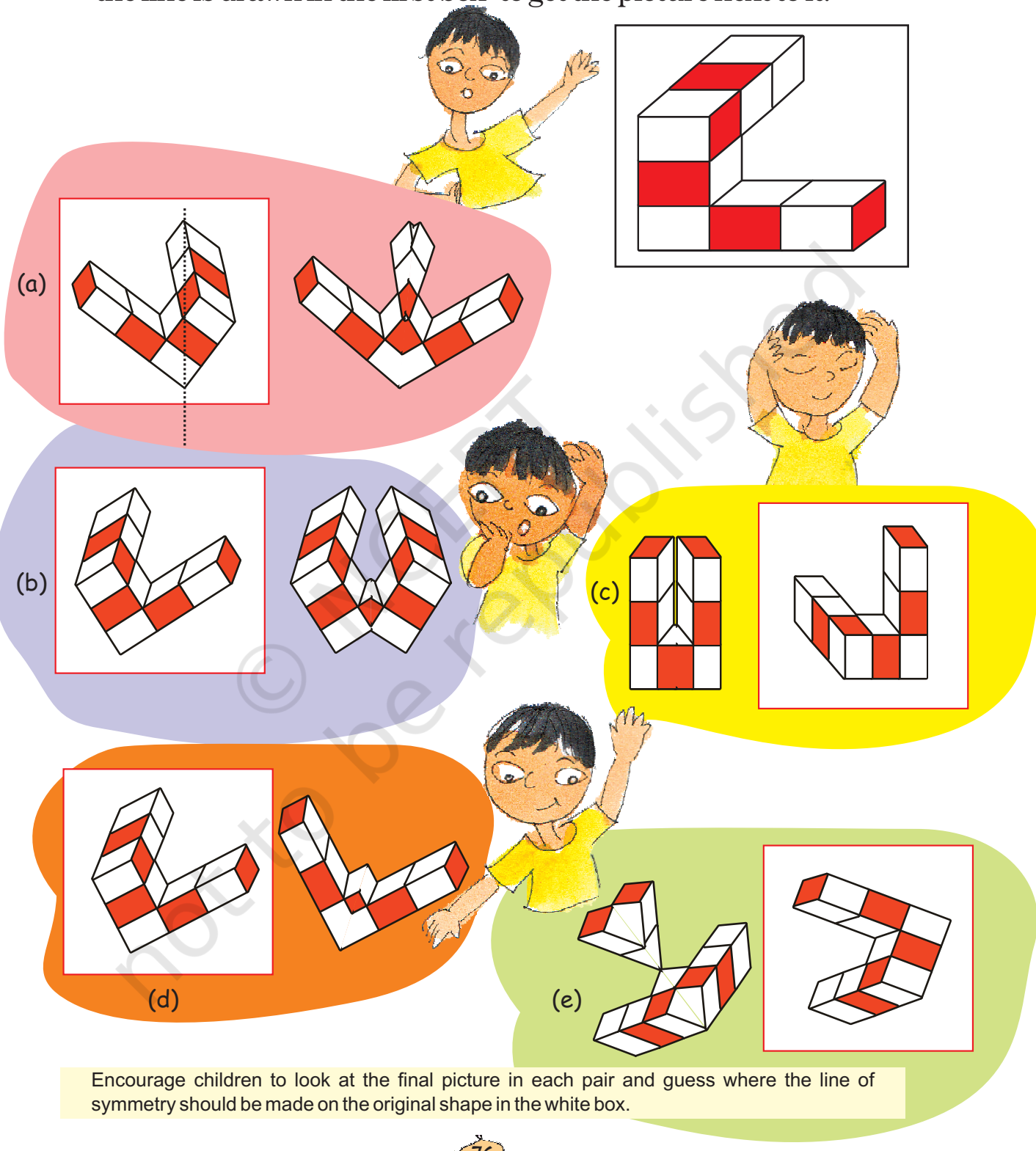
2. Venky has made a red and white shape. Make a line on the white box where you will keep a mirror to get that shape. Look at how the line is drawn in the first box to get the picture next to it.



Encourage children to look at the final picture in each pair and guess where the line of symmetry should be made on the original shape in the white box.

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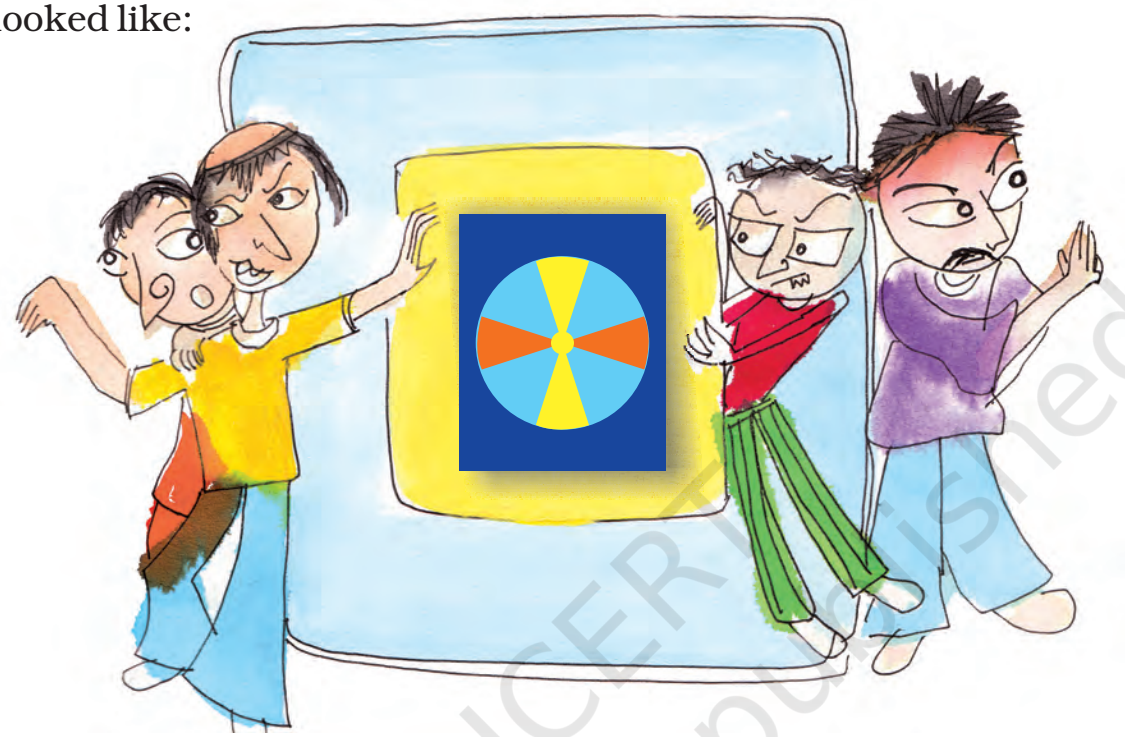
Half a Turn

Once there was a king. He was upset because thieves kept stealing costly jewels from his locker. Here is what the locker looked like:



The locker could be opened by giving its handle half a turn. Another half turn and the locker would be locked again.

The king would often leave the locker open thinking it was locked. Can you guess the reason?

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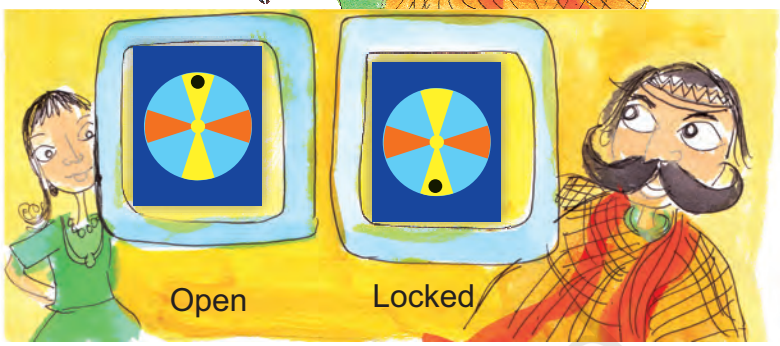
One day his clever daughter gave him an idea which he liked very much. Now he never got confused.

Can you guess what the idea was?

The king's daughter asked the king to put a dot on one of the yellow blades.

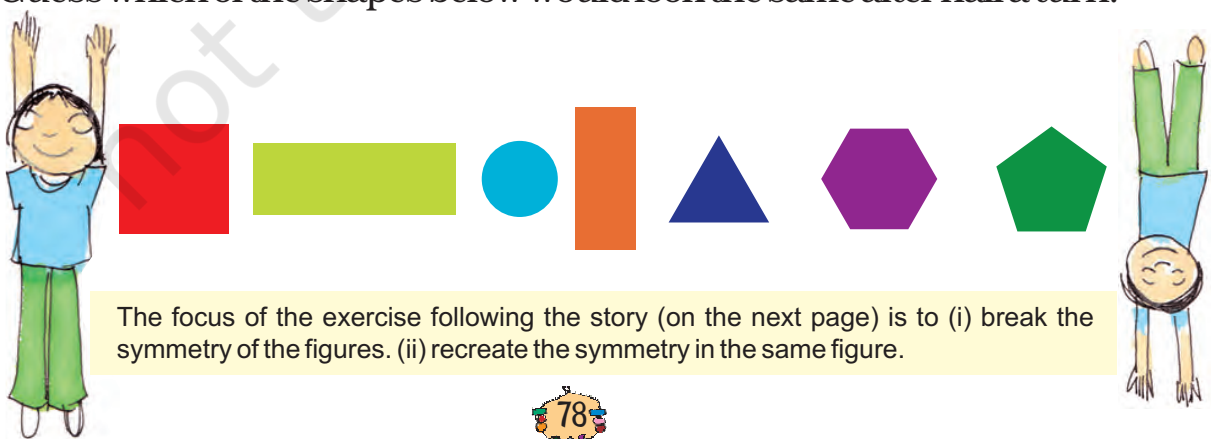


The king had many such lockers with different handles. Check if, on giving them half a turn, he can get confused with these too.

What will you do to solve the problem for each of these?

Same after ½ turn?

Guess which of the shapes below would look the same after half a turn.



The focus of the exercise following the story (on the next page) is to (i) break the symmetry of the figures. (ii) recreate the symmetry in the same figure.

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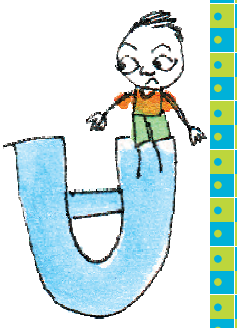
Do you find it difficult to tell? If yes, then there is a way to check your guess. Here's how you can do it.

Take any of the shapes. Trace its outline on a sheet of paper. Now keep the shape on its outline and give it a half turn. See if the shape fits its outline.

Practice time

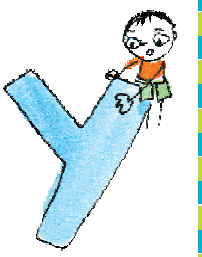
1) Find out which letters in the English alphabet look the same after half a turn.



2) Which of these English words reads the same on half a turn?

ZOOM, MOW, SWIMS, SIS, NOON

3) Give half a turn to the numbers from 0 to 9. Find which of them still looks the same.



4) Think of all 2, 3 and 4 digit numbers which look the same on half a turn.

Example

2 digit numbers 11, _____, _____

3 digit numbers 101, 111, _____, _____, _____, _____, _____, _____

4 digit numbers 1001, 1111, _____, _____, _____, _____, _____

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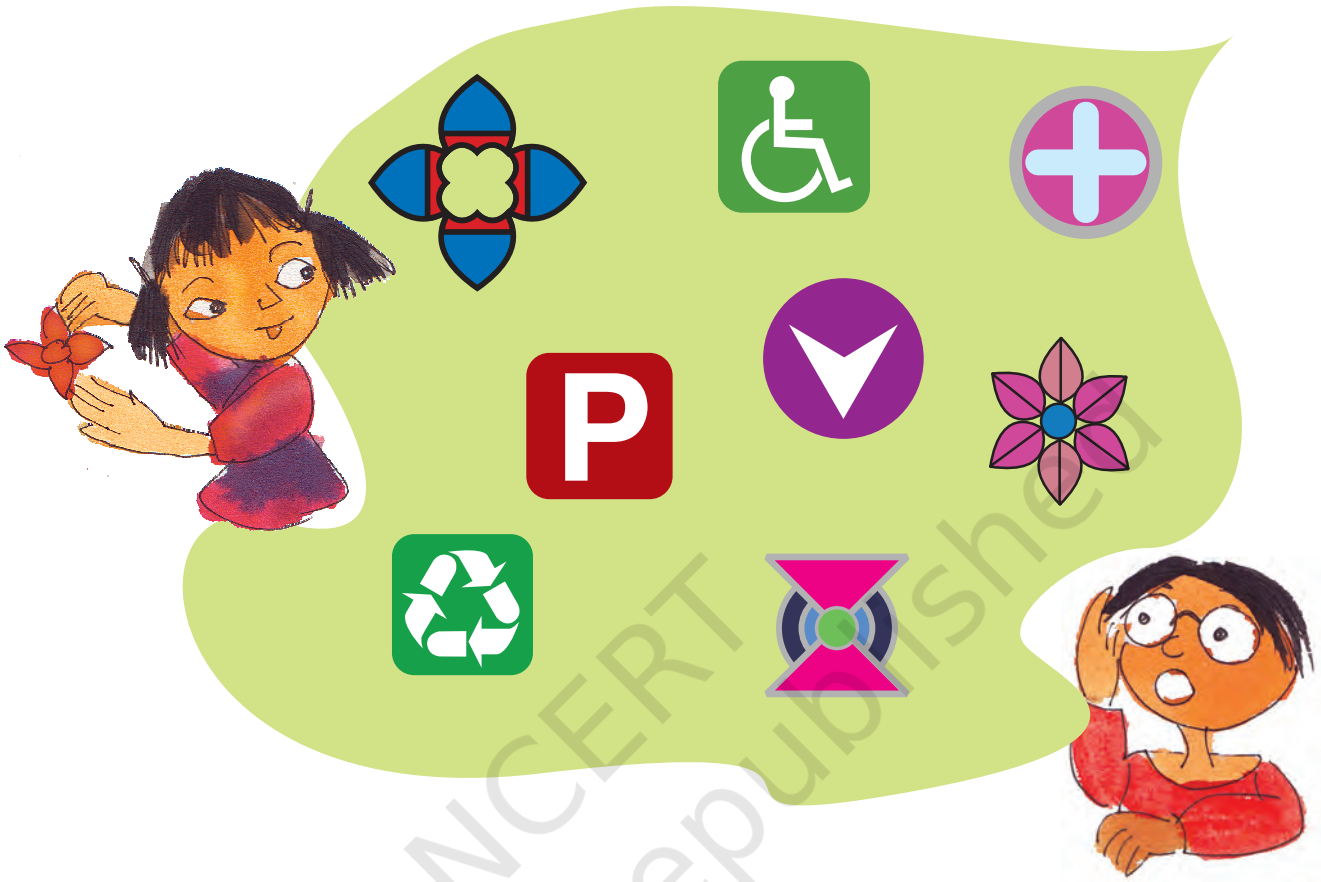
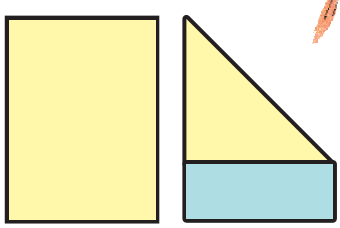
5) Which among the following pictures will look the same on half a turn?



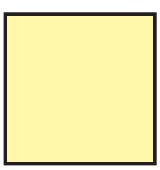
Activity Time

Have you ever seen a windmill? What is it used for?

Let us make a toy windmill.



1. Take a sheet of paper.
2. Fold it as shown in the picture.
3. Cut out the blue part of the paper. Your sheet of paper will now look like a square.



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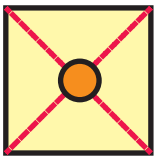
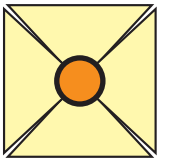
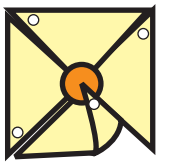


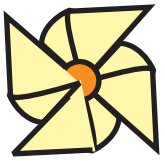
4. Fold it along the red lines and then open the fold. Draw a circle on the sheet as shown in the picture.



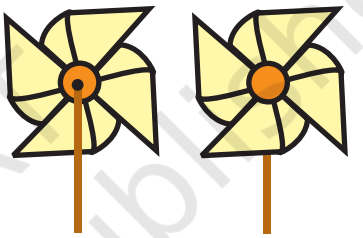
5. Cut along the red lines till you reach the circle. The paper will look like this.



6. Take a pin and make holes on the four corners as shown in the picture.



7. Now fold the corners such that all the holes lie one on top of the other.



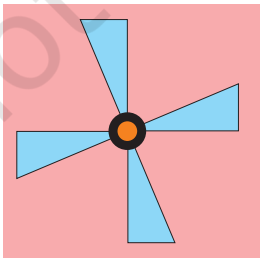
8. Pass the pin through the holes and fix it in the stick.

Your windmill is ready. Run with it and see how fast it moves.

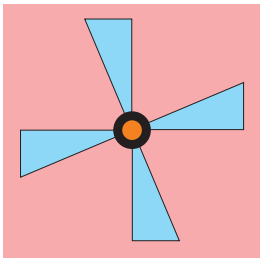
- Does your windmill look the same on $\frac{1}{4}$ of a turn?
- Does it look the same on half a turn? Discuss.

One-fourth Turn

Does the fan look the same on $\frac{1}{4}$ turn?



Before turning it



After $\frac{1}{4}$ turn

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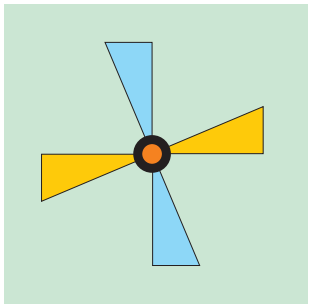
Will this fan also look the same after $\frac{1}{4}$ turn? Draw in the yellow box.



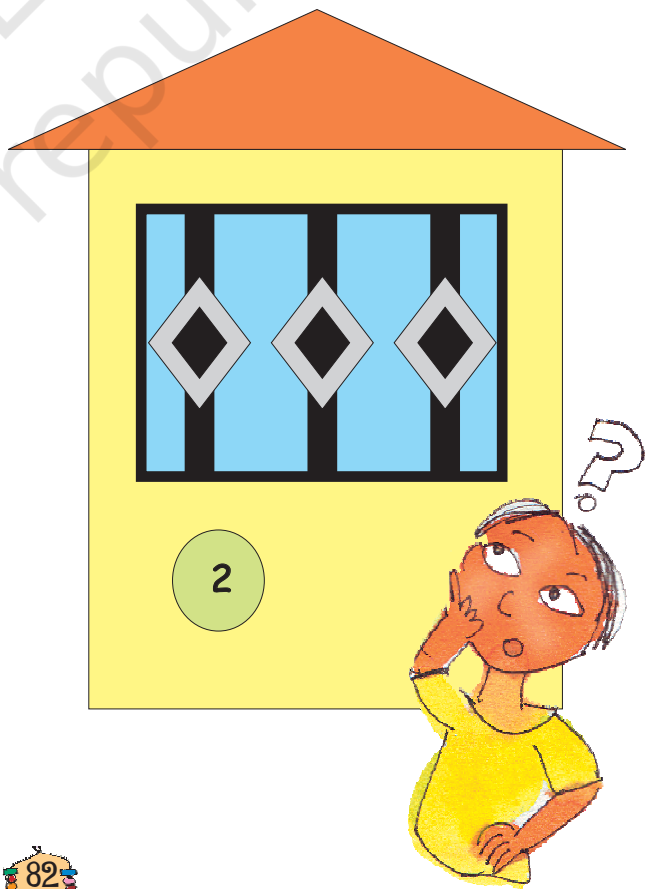
Before turning it

After $\frac{1}{4}$ turn

Practice time

A) ❊ Among the following shapes, find out which ones would look the same after $\frac{1}{4}$ turn. Put a (✓).

❊ Put a (✗) on the shapes that will not look the same after half a turn.



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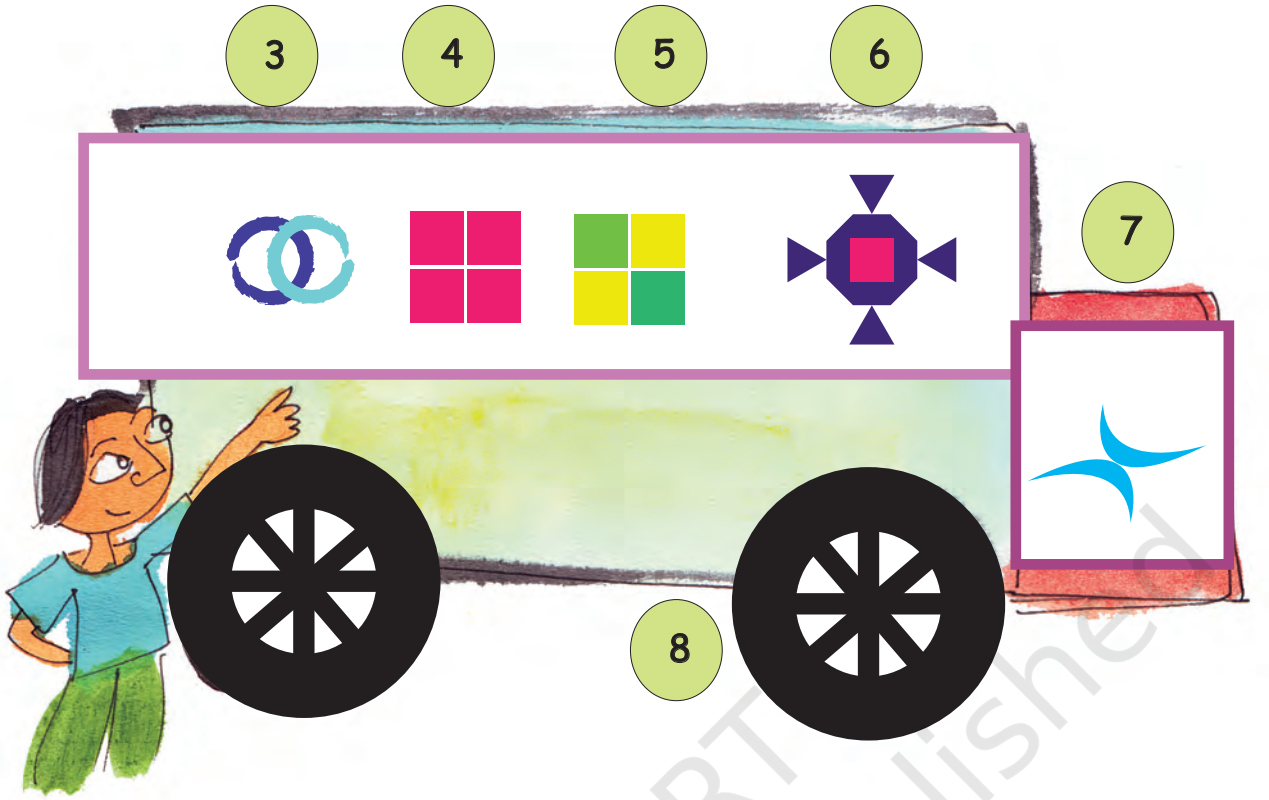
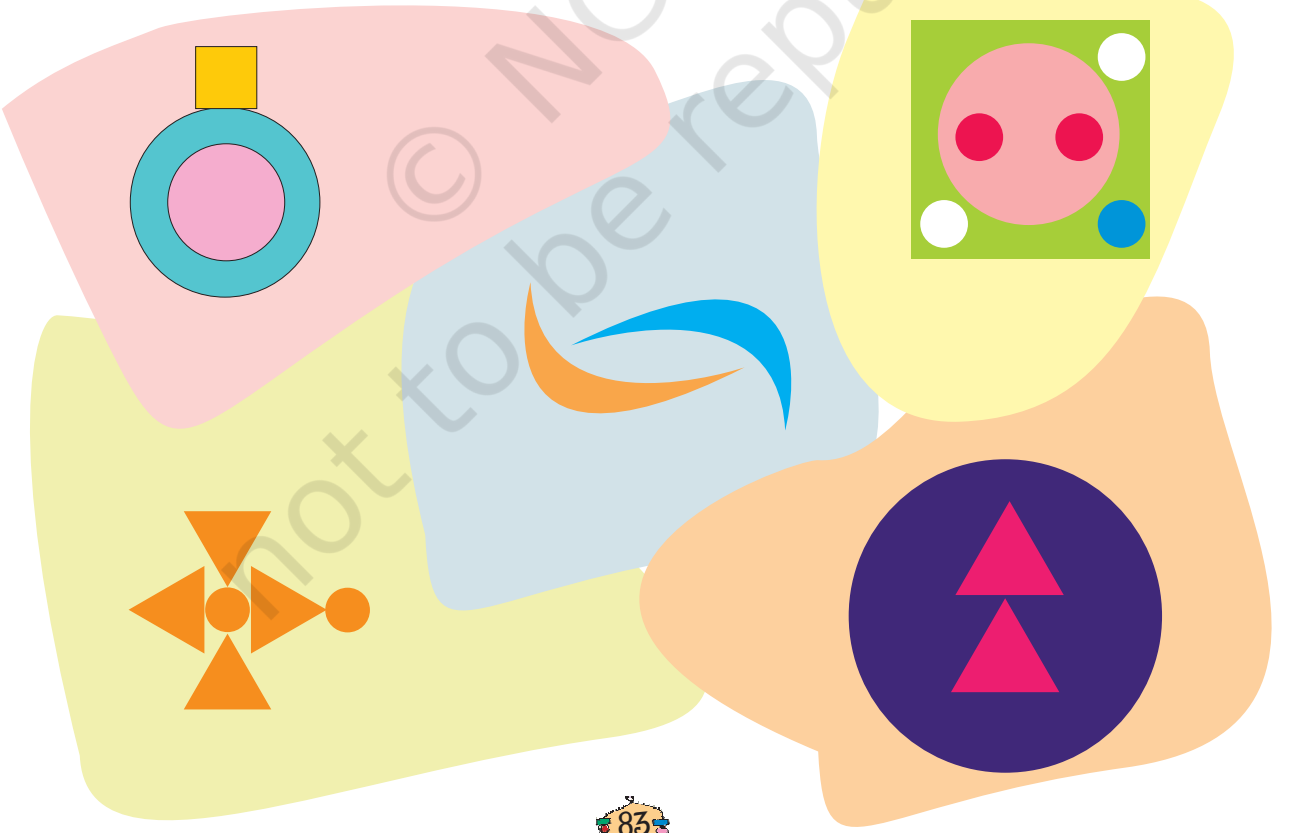


B) Try and change the shapes in such a way that the new shape remains the same on giving it half a turn.



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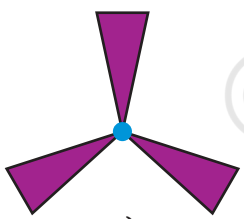
C) Draw what the following shapes would look like on $\frac{1}{4}$ turn and half a turn.

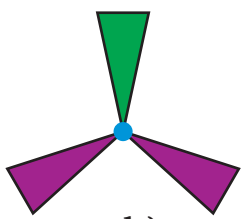
	On $\frac{1}{4}$ turn	*On half turn*
a)		
b)		
c)		
d)		

Which of the above shapes do not look the same on $\frac{1}{4}$ turn? Which shapes do not look the same on $\frac{1}{2}$ a turn?

❊ Which fan will look the same on a $\frac{1}{3}$ turn?

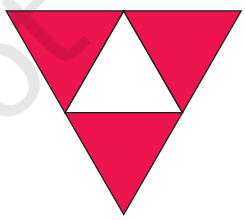


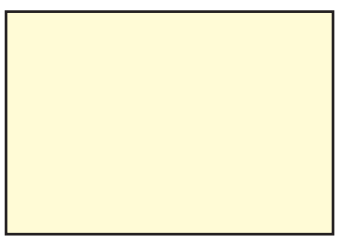
a)



b)

❊ Draw this shape after $\frac{1}{3}$ turn.





Shape after $\frac{1}{3}$ turn

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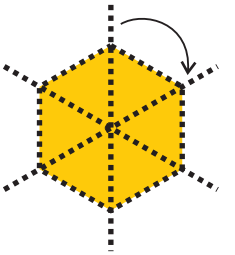
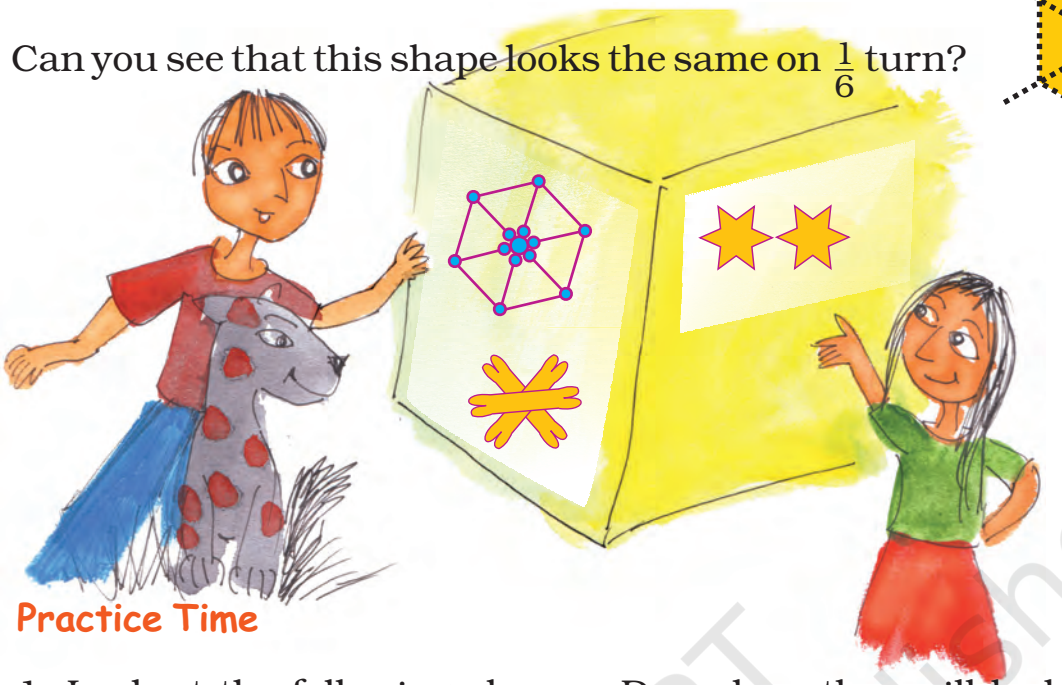
One-sixth Turn



Can you see that this shape looks the same on $\frac{1}{6}$ turn?



Practice Time

1. Look at the following shapes. Draw how they will look on $\frac{1}{3}$ and $\frac{1}{6}$ turn.

	$\frac{1}{3}$ *turn*	$\frac{1}{6}$ *turn*

Encourage children to look at the figure and see what kind of a symmetry is there . If they need they can draw six lines to see how to rotate a figure through $\frac{1}{6}$ turn. They should also be able to see that a figure which looks the same on $\frac{1}{6}$ turn will also look the same on $\frac{1}{3}$ turn (which is the same as two $\frac{1}{6}$ turns).

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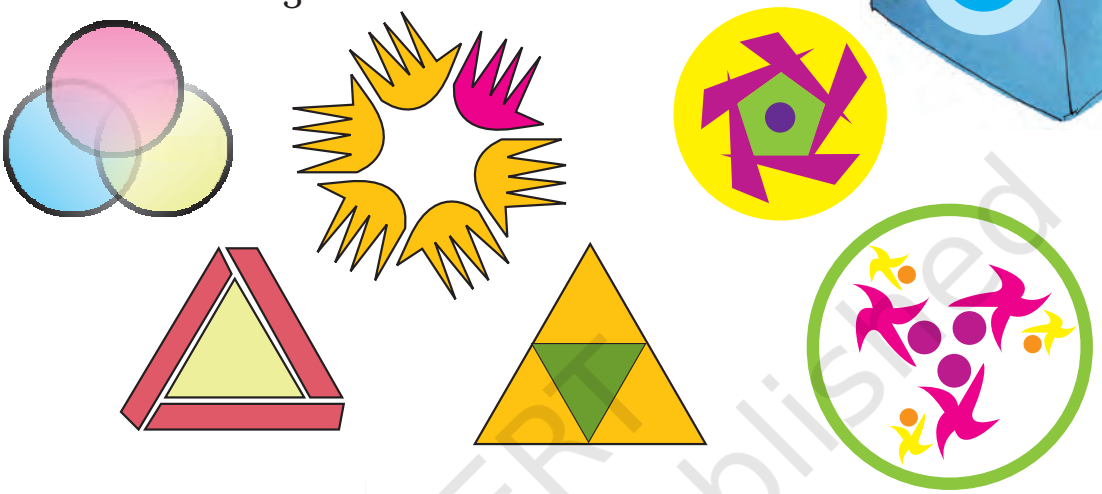
2. Look at the following shapes —

a) Find out which of these figures look the same on $\frac{1}{3}$ turn. Mark them with (✓).

b) Which are the ones that will not look the same after $\frac{1}{3}$ turn? Mark them with (✗).



c) Try and change the shapes below in such a way that they look the same on $\frac{1}{3}$ turn.

3. Draw some shapes which will look the same after $\frac{1}{3}$ turn.

4. Draw some shapes which will look the same after $\frac{1}{6}$ turn.

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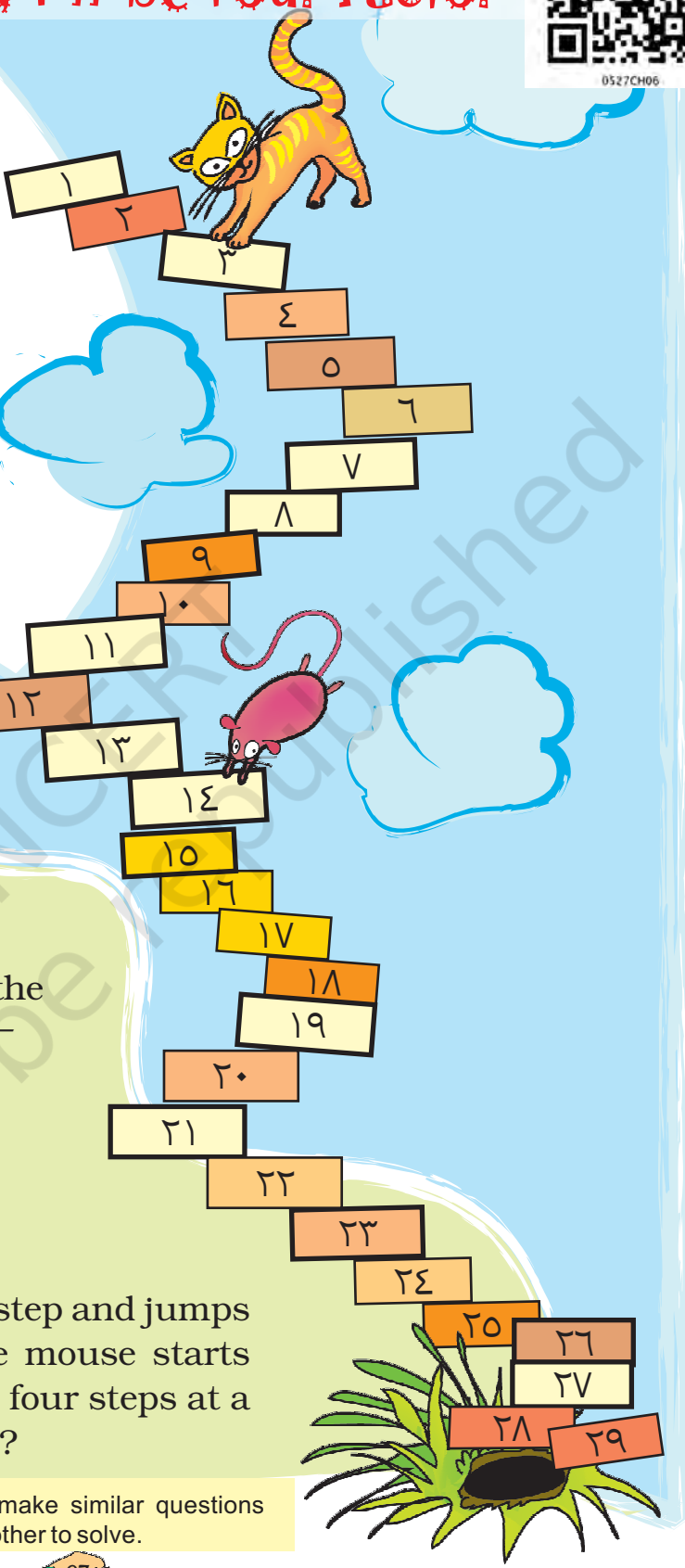
6 Be My Multiple, I'll be Your Factor

The Mouse and the Cat

The hungry cat is trying to catch Kunjan the mouse. Kunjan is now on the 14th step and it can jump 2 steps at a time. The cat is on the third step. She can jump 3 steps at a time. If the mouse reaches 28 it can hide in the hole. Find out whether the mouse can get away safely!



a) The steps on which the mouse jumps —

_____

b) The steps on which the cat jumps —

_____

c) The steps on which both the cat and the mouse jump —

d) Can the mouse get away?

Find out

If the cat starts from the 5th step and jumps five steps at a time and the mouse starts from the 8th step and jumps four steps at a time, can the mouse get away?

Children should be encouraged to make similar questions with different multiples and ask each other to solve.

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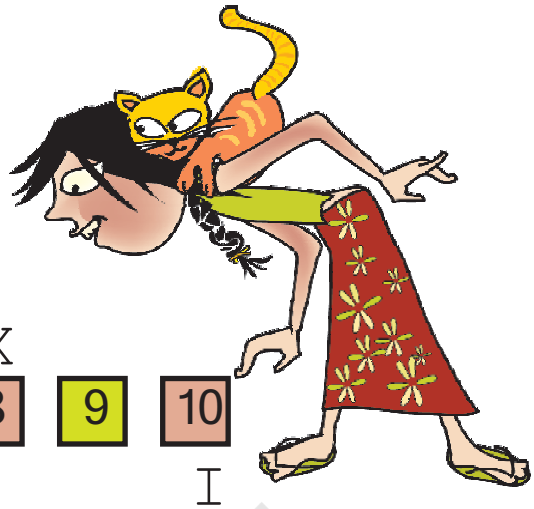
Who is Monto waiting for?

Monto cat is waiting for somebody. Do you know for whom he is waiting? There is a trick to find out.



			D				X		
1	2	3	4	5	6	7	8	9	10
	M					P			I
11	12	13	14	15	16	17	18	19	20
			O						
21	22	23	24	25	26	27	28	29	30
R			N		U				
31	32	33	34	35	36	37	38	39	40
			B	W			S		
41	42	43	44	45	46	47	48	49	50
	J				H				E
51	52	53	54	55	56	57	58	59	60

Mark with a red dot all the numbers which can be divided by 2.

Mark a yellow dot on the numbers which can be divided by 3 and a blue dot on the numbers which can be divided by 4.

Which are the boxes which have dots of all three colours?

What are the letters on top of those boxes?

Write those letters below in order.

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Meow Game

To play this game, everyone stands in a circle. One player calls out 'one'. The next player says 'two' and so on. A player who has to call out 3 or a number which can be divided by 3 has to say 'Meow' instead of the number. One who forgets to say 'Meow' is out of the game. The last player left is the winner.

Which numbers did you replace with 'Meow'?

3, 6, 9.....

We say these numbers are the **multiples** of 3.

Play the game by changing the number to 4.

Now, which numbers did you replace with 'Meow'?

These numbers are the multiples of 4.

❊ Write any ten multiples of 5.

Make children play this game several times with multiples of different numbers.

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Dice Game

Throw two dice together. What are the numbers that turn up on the faces of the dice? Make a two-digit number using them. If it is a multiple of any of the numbers written next to the circles, you can write it in that circle. Then it is your friend's turn. The one who can write more numbers in 10 rounds is the winner.

6

4

5

7

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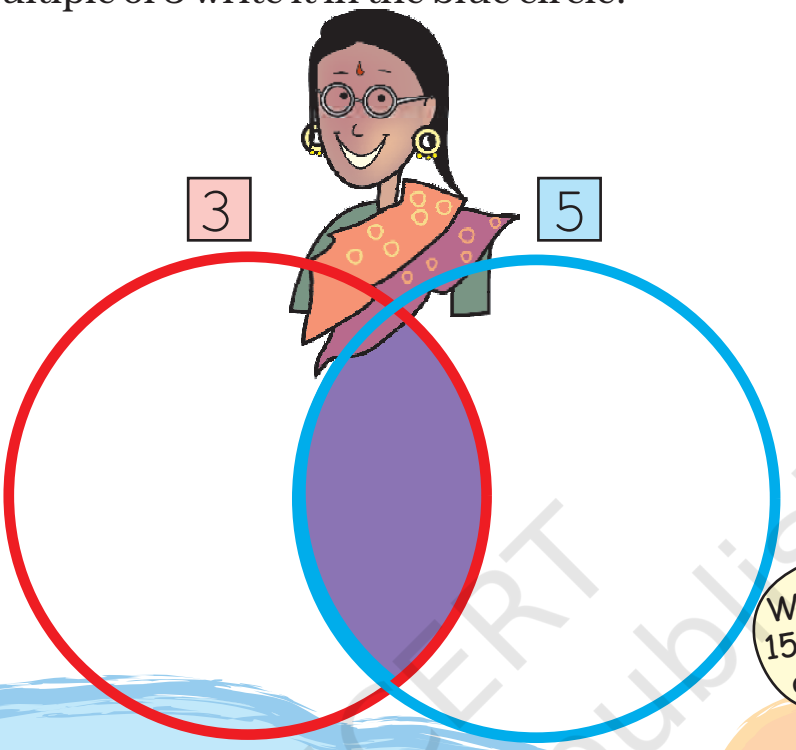
Common Multiples

Think of a number. If it is a multiple of 3 write it in the red circle. If it is a multiple of 5 write it in the blue circle.



Some numbers are multiples of both 3 and 5.

So we can say that they are **common** to both 3 and 5.

Think! If you write the multiples common to 3 and 5 in the purple part, then will they still be in both the red and the blue circles?

* Which is the smallest among these **common multiples**? _____

Repeat the game using the numbers 2 and 7.

* Write the common multiples of 2 and 7.

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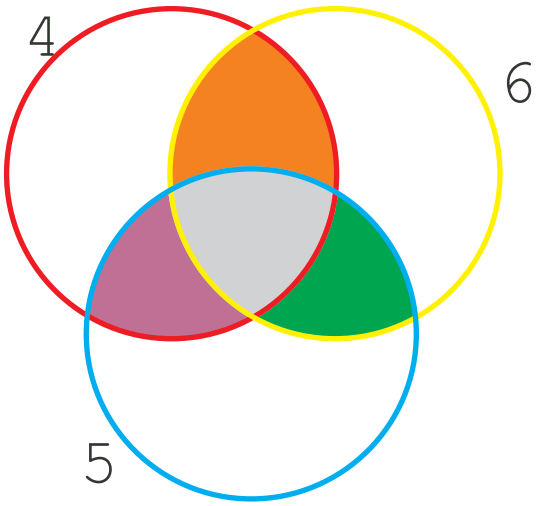
Repeat the game by putting the multiples of 4, 6 and 5 in the circles.



- What common multiples of 5 and 6 did you write in the green part?
- What common multiples of 4 and 6 are written in the orange part?
- In which coloured part did you write the common multiples of 4,6 and 5?
- What is the smallest common multiple of 4, 6 and 5? _____

Puzzle

Tamarind seeds

Sunita took some tamarind (*imli*) seeds. She made groups of five with them, and found that one seed was left over. She tried making groups of six and groups of four. Each time one seed was left over. What is the smallest number of seeds that Sunita had?

Encourage children to try out themselves such activities using seeds, pebbles etc.

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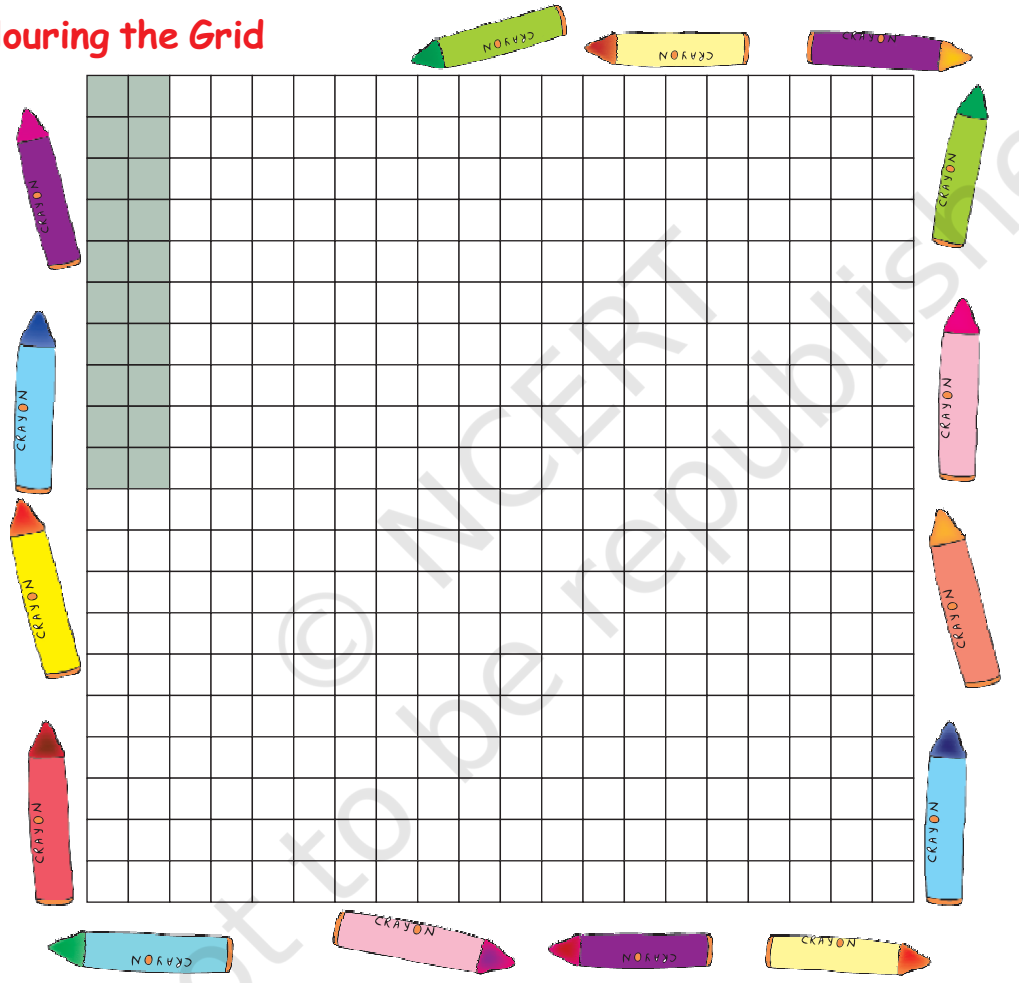
More tamarind seeds

Ammini is arranging 12 tamarind seeds in the form of different rectangles. Try to make more rectangles like this using 12 tamarind seeds. How many different rectangles can you make?

If there are 15 tamarind seeds how many rectangles can you make?

Colouring the Grid



In the grid here, a rectangle made of 20 boxes is drawn.

The width of this rectangle is 2 boxes.

- What is its length?
- Colour a rectangle made of 20 boxes in some other way.

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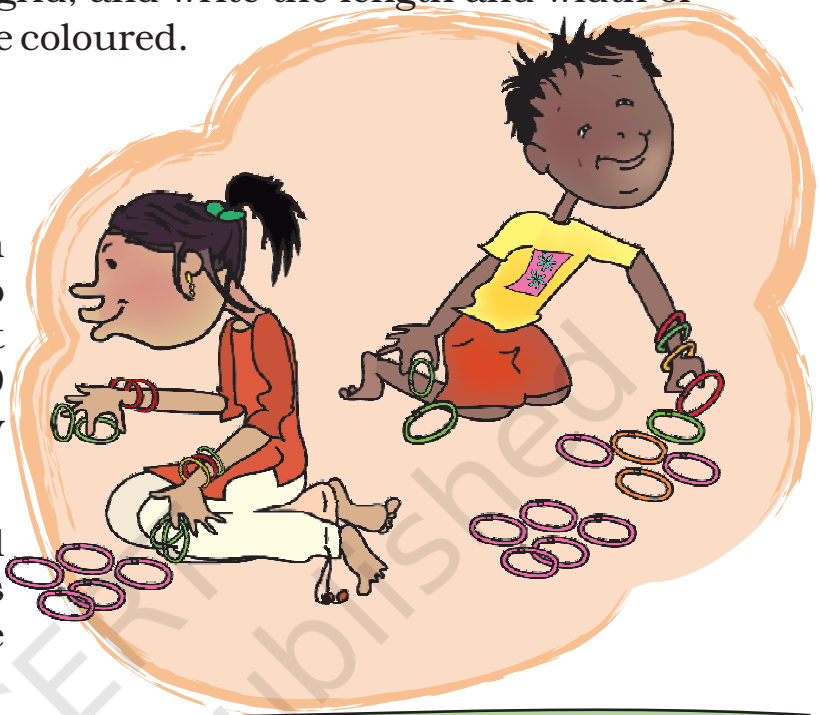
❊ What is the length and width of the rectangle you coloured?

❊ In how many ways can you colour a rectangle of 20 boxes? Colour them all in the grid, and write the length and width of each rectangle you have coloured.

Bangles

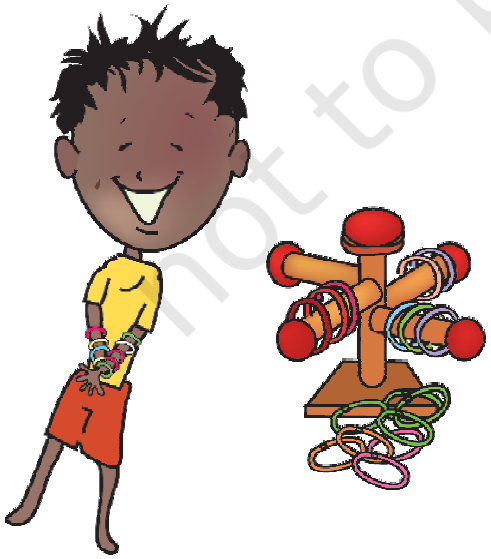


There are 18 bangles on the rod. Meena is trying to group them. She can put them in groups of 2, 3, 6, 9 and 18 — without any bangle being left.

❊ How many groups will she have if she makes groups of 1 bangle each? ____

Now complete the table, for different numbers of bangles. For each number see what different groups can be made.

Number of bangles	*Different groups we can make*
18	1, 2, 3, 6, 9, 18
24	1, 2, ...
5	
9	
7	
2	
10	
1	
20	
13	
21	



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Fill the Chart

Complete the multiplication chart given here.

×	1	2	3	4	5	6	7	8	9	10	11	12
1												**12**
2						**12**						
3				**12**			21					
4			**12**							40		
5				20								
6		**12**										
7												
8									72			
9												
10												
11						66						
12	**12**											

Look at the green boxes in the chart. These show how we can get 12 by multiplying different numbers.

12
4×3
6×2
1×12

12 = 4 × 3, so 12 is a multiple of both 4 and 3. 12 is also a multiple of 6 and 2, as well as 12 and 1. We say 1, 2, 3, 4, 6, 12 are **factors** of 12.

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❊ What are the factors of 10? _____

Can you do this from the chart?

10
5×2
___

❊ What are the factors of 36 ? _____

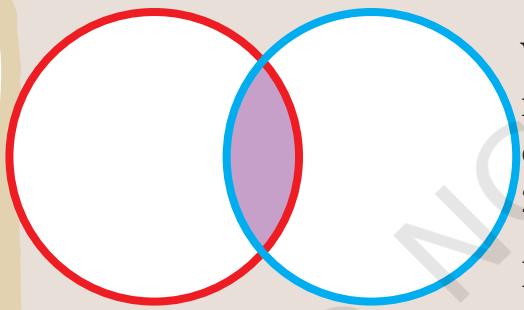
❊ Find out all the factors of 36 from the multiplication chart.

❊ What is the biggest number for which you can find the factors from this chart?

❊ What can you do for numbers bigger than that?

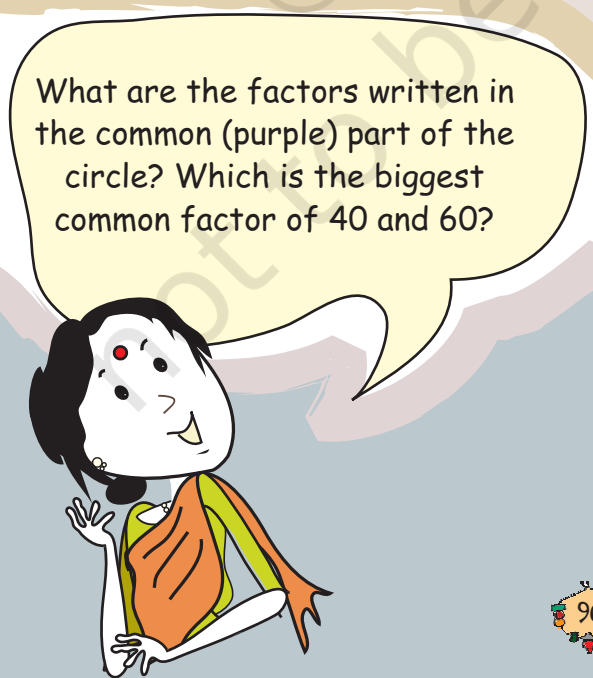
Common factors

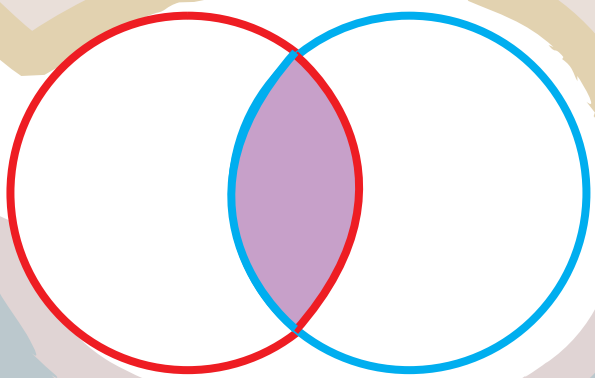
Write the factors of 25 in the red circle and the factors of 35 in the blue circle.



Which are the factors you have written in the common part (purple) of both circles? These are **common factors** of 25 and 35.

Now write the factors of 40 in the red circle and 60 in the blue circle.





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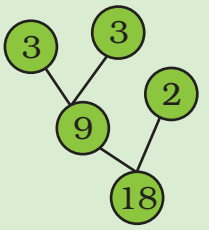
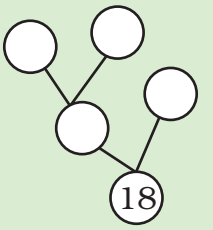
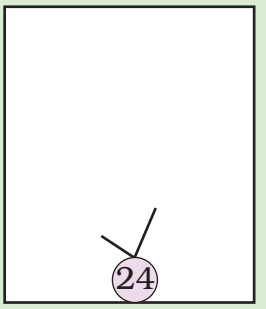
Factor Tree

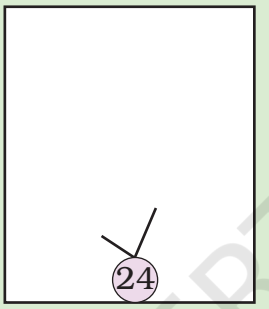
Look at the factor tree. Now can you make another tree like this?

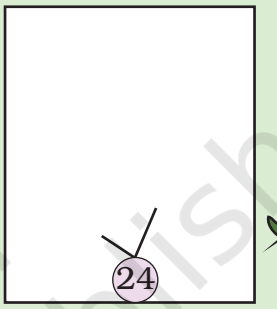




❊ In how many ways can you draw a factor tree for 24? Draw three of them below.







❊ Try drawing the factor tree using other numbers also.

Tiling Problems

1) There is a garden in Anu's house. In the middle of the garden there is a path. They decided to tile the path using tiles of length 2 feet, 3 feet and 5 feet.

The mason tiled the first row with 2 feet tiles, the second row with 3 feet tiles and the third row with 5 feet tiles. The mason has not cut any of the tiles. Then what is the shortest length of the path?

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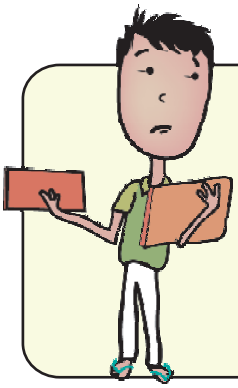
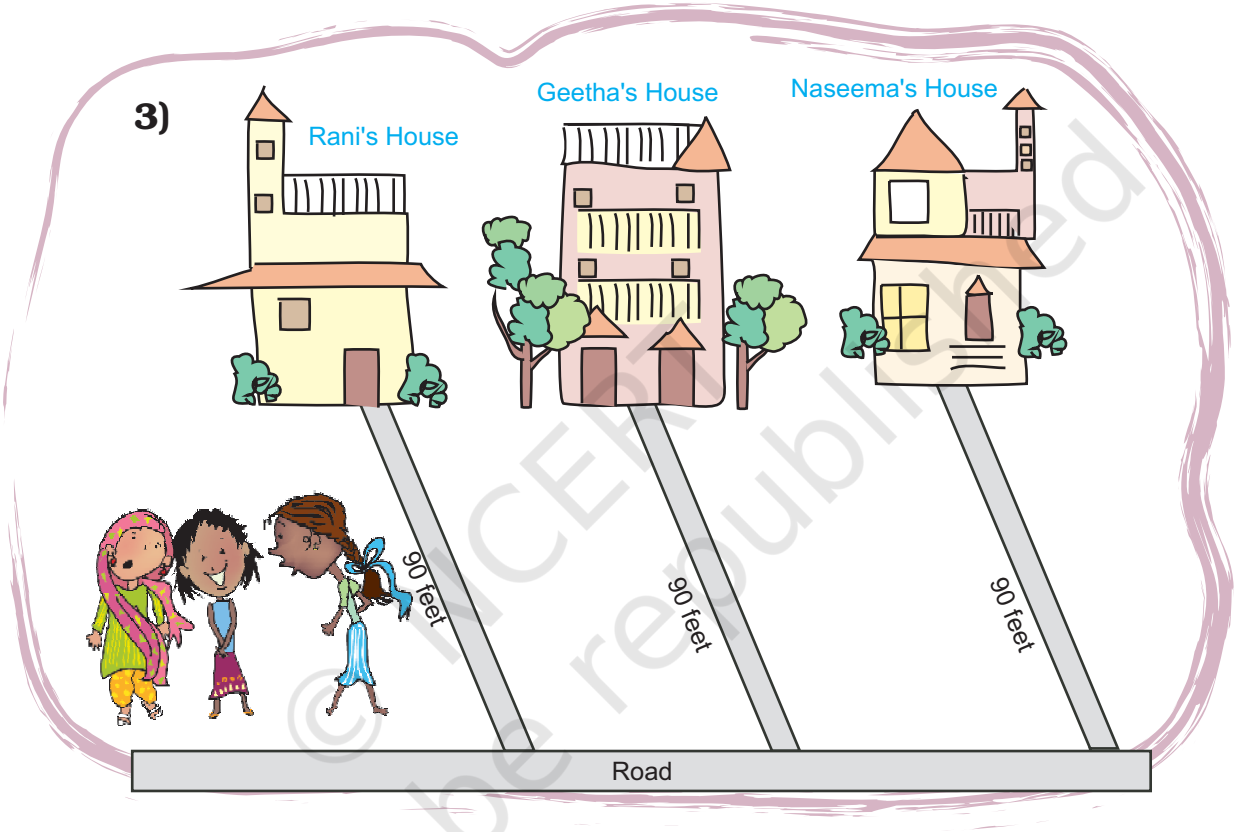


2) Manoj has made a new house. He wants to lay tiles on the floor. The size of the room is 9 feet × 12 feet. In the market, there are three kinds of square tiles: 1 foot × 1 foot, 2 feet × 2 feet and 3 feet × 3 feet. Which size of tile should he buy for his room, so that he can lay it without cutting?

3)



Rani, Geetha and Naseema live near each other. The distance from their houses to the road is 90 feet. They decided to tile the path to the road. They all bought tiles of different designs and length. Rani bought the shortest tile,Geetha bought the middle sized one and Naseema bought the longest one. If they could tile the path without cutting any of the tiles, what is the size of the tiles each has bought? Suggest 3 different solutions. Explain how you get this answer.

It will be useful to have a discussion about a 'foot' and how we use it often to talk about our own heights. Children can use their cm scale to get idea about how long a foot is.

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7 Can You See the Pattern?

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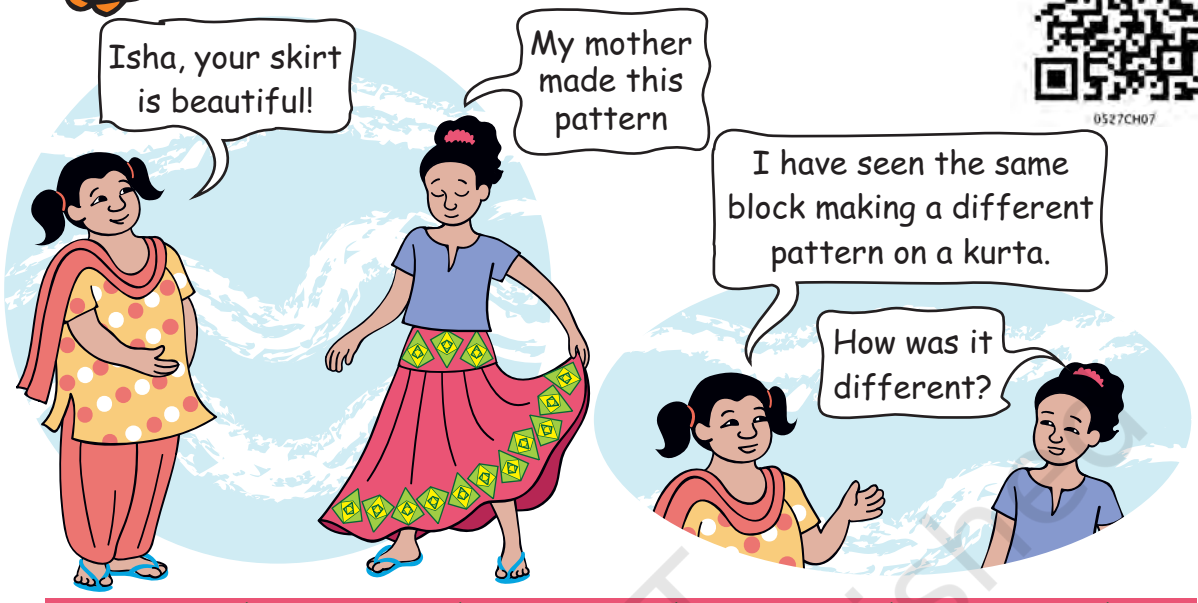

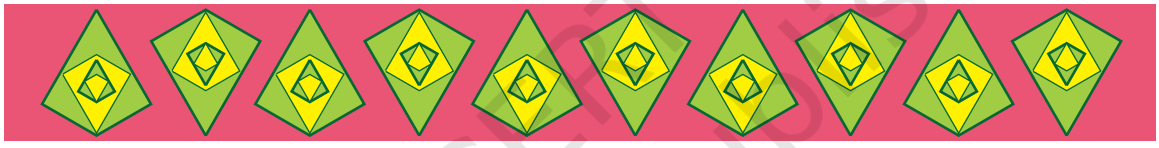

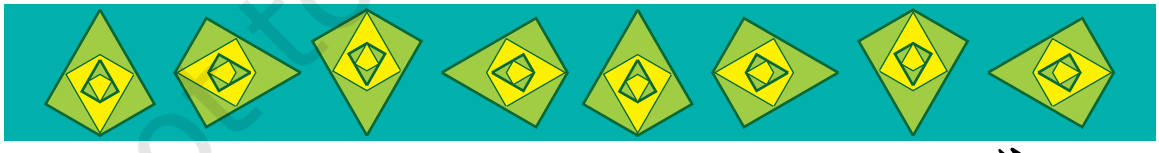

Now you use these two rules to make patterns with this block.

Also make your own rule.

In Math-Magic Class IV (page 107- 108) , children have seen how one motif is used in 3 different ways and in Class III (page 145), the same sequence of motifs is repeated. Discuss how the motif here turns clockwise.

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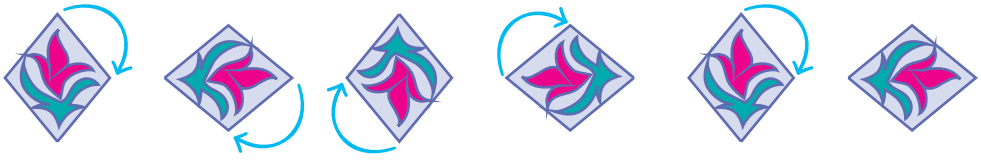
Turns and Patterns

Look at this block . We make three different rules to turn it clockwise and see the patterns.

Rule 1: Repeat it with a one-fourth turn.

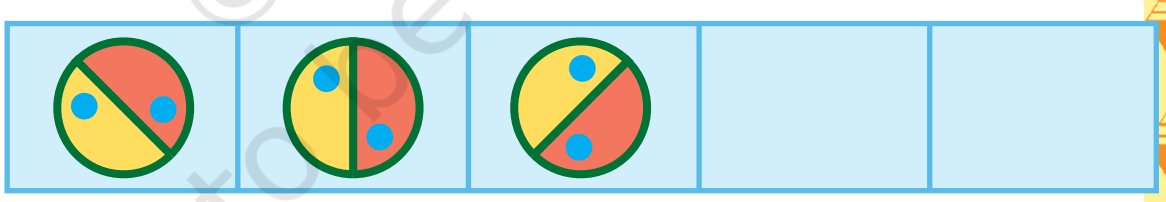


Rule 2: Repeat it with a half turn.

Rule 3: Repeat it with a three-fourth turn.

Practice time

1) What should come next?

a) 

b)

Encourage children to think of other alternatives. Answers obtained by anticlockwise turns should also be accepted and discussed.

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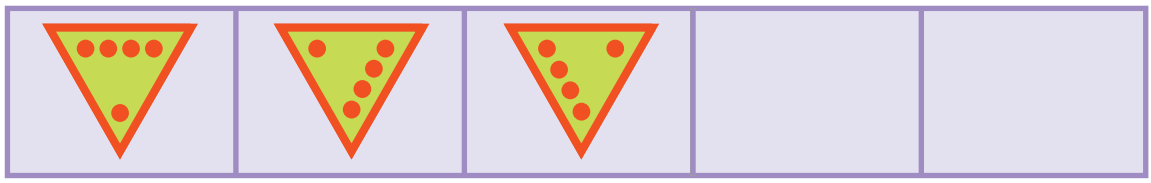
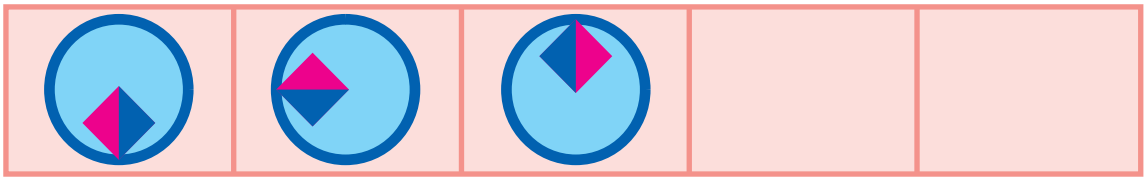
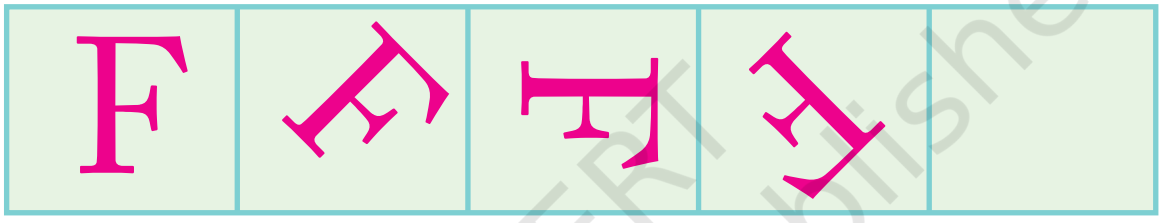
c) 

d) 

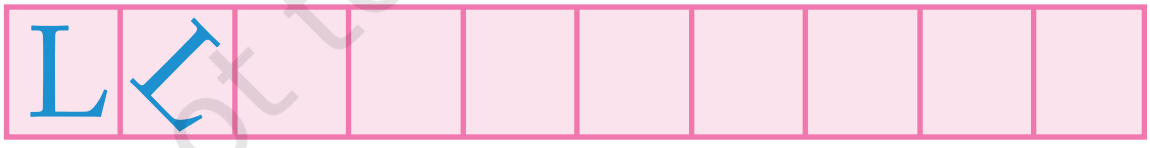
2) See this pattern

a) 

The **rule** of the pattern is — turning by 45° each time. Which will be the next? Tick (✓) the right one.

( ) ( ) ( )

Using the same rule take it forward till you get back to what you started with.

b) 

c)

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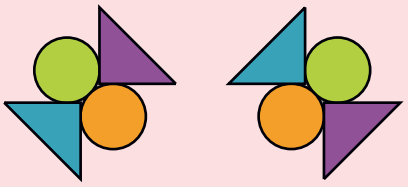
3) Some patterns are given below on the left side of the red line. For each pattern, write the rule. Then choose what comes next from the right side of the line and tick (✓) it.

a)

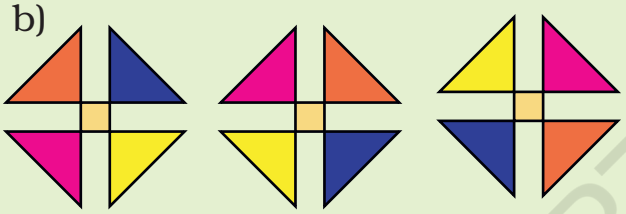


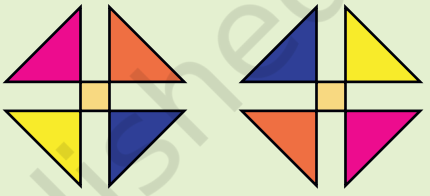
( ) ( )

Rule: _____

_____

b)



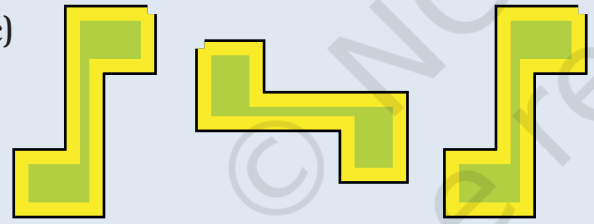


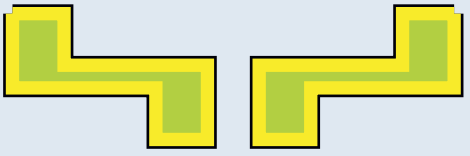
( ) ( )

Rule: _____

_____

c)



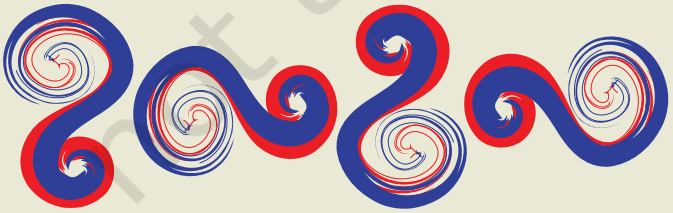


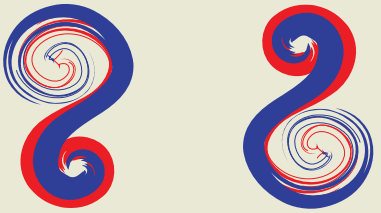
( ) ( )

Rule: _____

_____

d)





( ) ( )

Rule: _____

_____

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Look for a Pattern

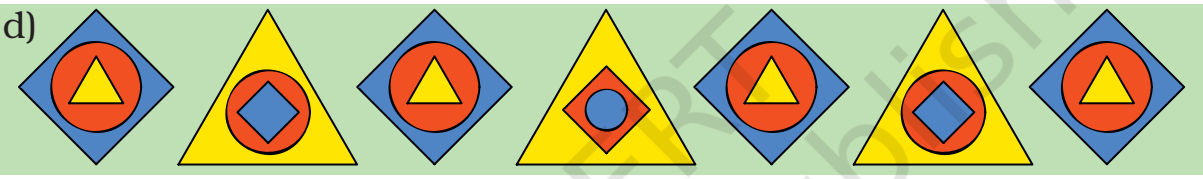
Mark that picture which is breaking the rule. Also correct it.

a)

b)

c)

d)



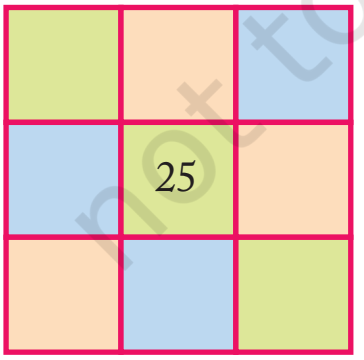
Magic Squares

Do you remember magic triangles? Come now, let's make some magic squares.

❊ Fill this square using all the numbers from 46 to 54.

Rule: The total of each line is 150.

		49
46		
	52	47



❊ Fill this square using all the numbers from 21 to 29.

Rule: The total of each side is 75.

You can see Math-Magic Class IV (page 11) for similar magic patterns.

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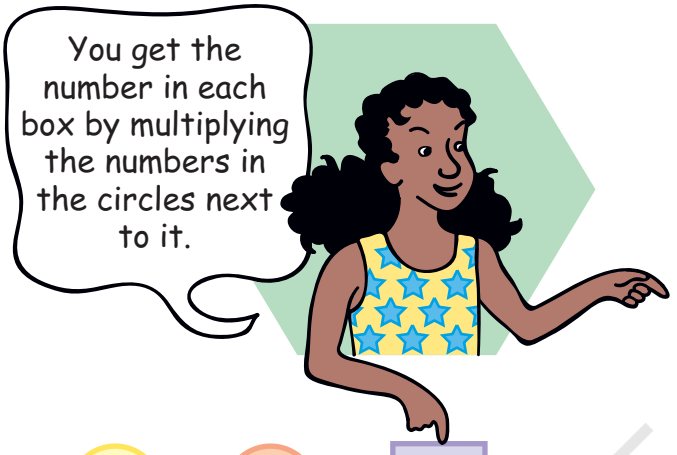
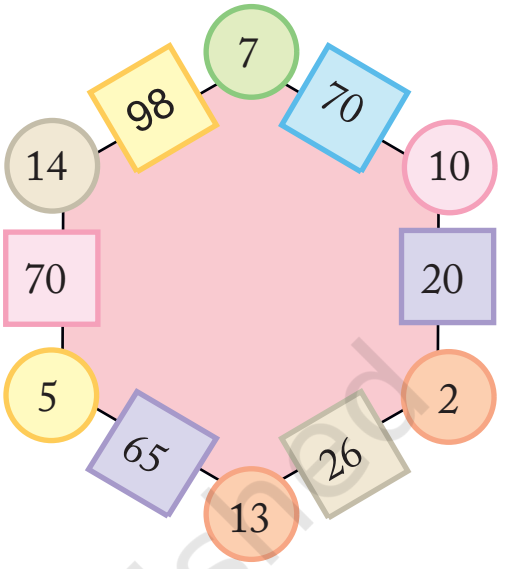
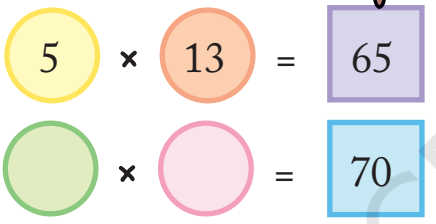
Magic Hexagons

Look at the patterns of numbers in hexagons.

Each side has 2 circles and 1 box.





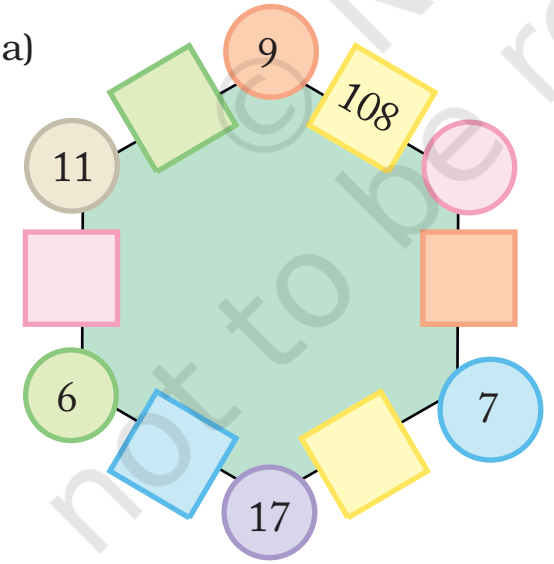


Look at the number 65 in the box. Which are the circles next to it?

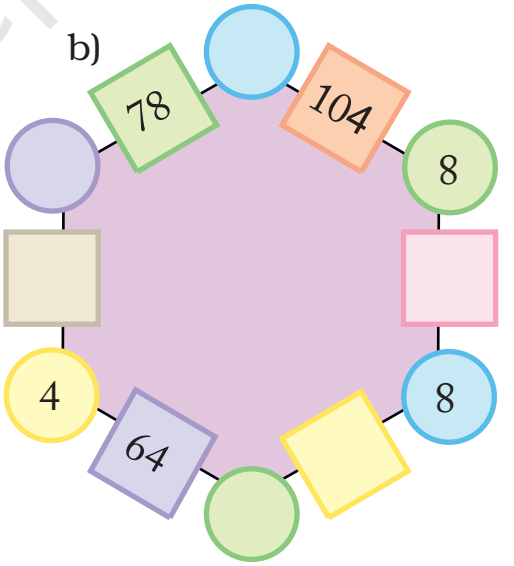
Can you see how the rule works?

❊ Use the same rule to fill the hexagons below.

a)



b)



Now you also make your own magic hexagons.

You can discuss that a hexagon is a six-sided closed figure, but this is not to be evaluated.

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Numbers and Numbers

24 + 19 + 37 = 37 + 24 + 19

215 + 120 + 600 = 600 + 215 + 120

❊ Are they equal?

❊ Fill in the blank spaces in the same way.

a) 14 + + = 34 + 14 + 20

b) + 42 + = 65 + + 80

c) 200 + 300 + = + 400 +

d) + + = + +

❊ Now, look at this — 48 × 13 = 13 × 48

Check if it is true or not.

Left Right — Same to Same

Discuss with students that changing the order of numbers does not make any difference to the sum.

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Take a number, say 43

Now turn it back to front 34

Then add them together 77

77 is one such special number.
There are many such numbers.

You have **reversed** the number by writing it back to front.

Take another number 48

Now turn it back to front 84

Then add them together 132

Is this a special number? No! Why not?

OK, carry on with the number 132

Again turn it back to front 231

Then add the two together 363

Ah! 363 is a special number.

So we see that to get special numbers we sometimes need more steps.

❊ Now you try and change these numbers into special numbers —

a) 28 b) 132 c) 273

Now let's use words in a special way.

NO LEMONS NO MELON

STEP NOT ON PETS

Did you notice that it reads the same from both sides — right to left and left to right?

Now try and use words in a special way.

Special words/numbers which read the same both ways are called palindromes. Help children to read them from both the ends.

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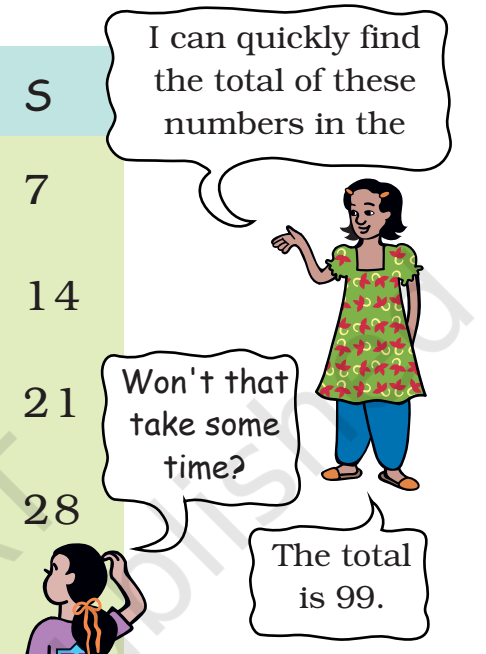
Calendar Magic

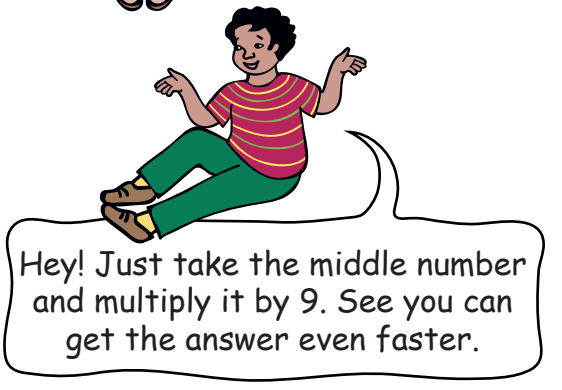
Look at the calendar below.

Let us mark a 3 × 3 box (9 dates) on the calendar and see some magic.

S	M	T	W	Th	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				



Take the smallest number	3
Add 8 to it	+8
=	11
Multiply it by 9	×9
Total	99



Now you choose any 3 × 3 box from a calendar and find the total in the same way. Play this game with your family.

You can see Math-Magic Class III (page 105 -106) for other calendar tricks.

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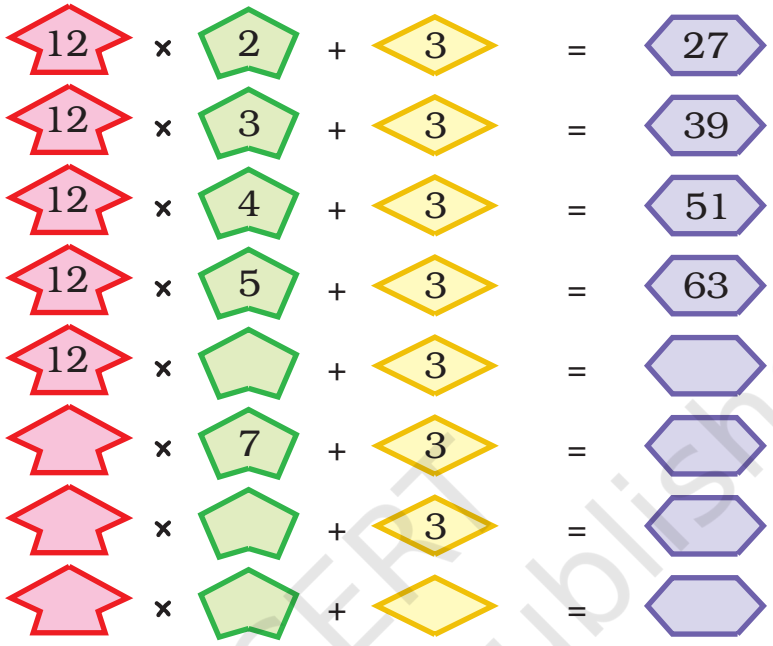
Some more Number Patterns

❊ Take any number. Now multiply it by 2, 3, 4 ..... at every step. Also add 3 to it at each step. Look at the difference in the answer. Is it the same at every step?



Now try doing it with some other number and also take a different number to add at each step .

❊ Look at the numbers below. Look for the pattern. Can you take it forward?

(9 – 1) ÷ 8 = 1

(98 – 2) ÷ 8 = 12

(987 – 3) ÷ 8 = 123

(9876 – 4) ÷ 8 = ____

(98765 – 5) ÷ 8 = ____

(_____ – __) ÷ 8 = ____

(_____ – __) ÷ 8 = ____

Encourage children to read aloud the numbers on the left hand side, even if they can not read them correctly. Some of the numbers are large. To help children read them, recall the concept of 1 lakh or 100 thousand.

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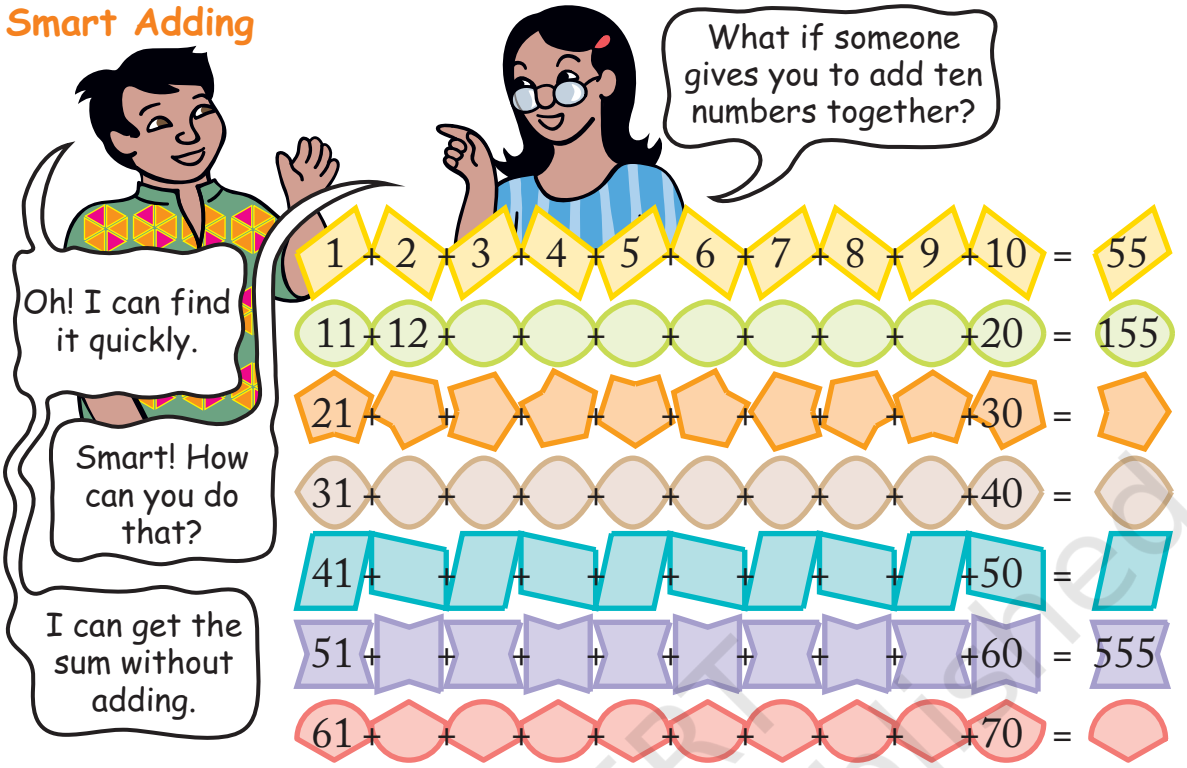
Smart Adding



❊ Did you notice some pattern in the answers?

Fun with Odd Numbers

Take the first two odd numbers. Now add them, see what you get.

Now, at every step, add the next odd number.

$1 + 3 = 4 = 2 \times 2$

$1 + 3 + 5 = 9 = 3 \times 3$

$1 + 3 + 5 + 7 = 16 = 4 \times 4$

$1 + 3 + 5 + 7 + 9 = \square = \square \times \square$

$1 + 3 + 5 + 7 + 9 + 11 = \square = \square \times \square$

$1 + 3 + 5 + 7 + 9 + 11 + 13 = \square = \square \times \square$

How far can you go on?

When we add the first n odd numbers, we will get the sum as n × n . Children should be left free to add the numbers.

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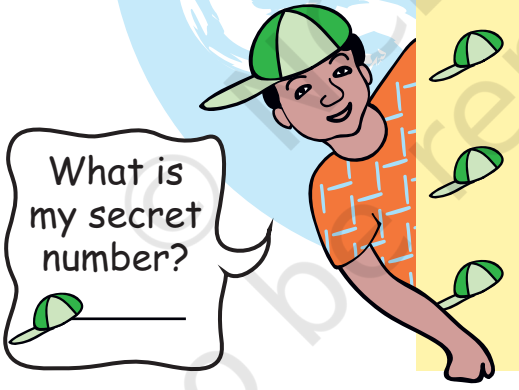
Secret Numbers

Banno and Binod were playing a guessing game by writing clues about a secret number. Each tried to guess the other's secret number from the clues.

Can you guess their secret numbers?

- It is larger than half of 100
- It is more than 6 tens and less than 7 tens
- The tens digit is one more than the ones digit
- Together the digits have a sum of 11



- It is smaller than half of 100
- It is more than 4 tens and less than 5 tens
- The tens digit is two more than the ones digit
- Together the digits have a sum of 6

* Write a set of clues for a secret number of your own. Then give it to a friend to guess your secret number.

Number Surprises

a) Ask your friend — Write down your age. Add 5 to it. Multiply the sum by 2. Subtract 10 from it. Next divide it by 2. What do you get?

Is your friend surprised?

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b)

☆ Take a number ☐

☆ Double it ☐ × 2 = ☐

☆ Multiply by 5 ☐ × 5 = ☐

☆ Divide your answer by 10 ☐ ÷ 10 = ☐

c)

☆ Take a number ☐

☆ Double it ☐ × 2 = ☐

☆ Again double it ☐ × 2 = ☐

☆ Add the number you took first to the answer ☐ + ☐ = ☐

☆ Now again double it ☐ × 2 = ☐

☆ Divide by 10 ☐ ÷ 10 = ☐

d) Look at this pattern of numbers and take it forward.

$1 = 1 \times 1$

$121 = 11 \times 11$

$12321 = 111 \times 111$

$1234321 = ?$

❊ Now make your own number surprises.

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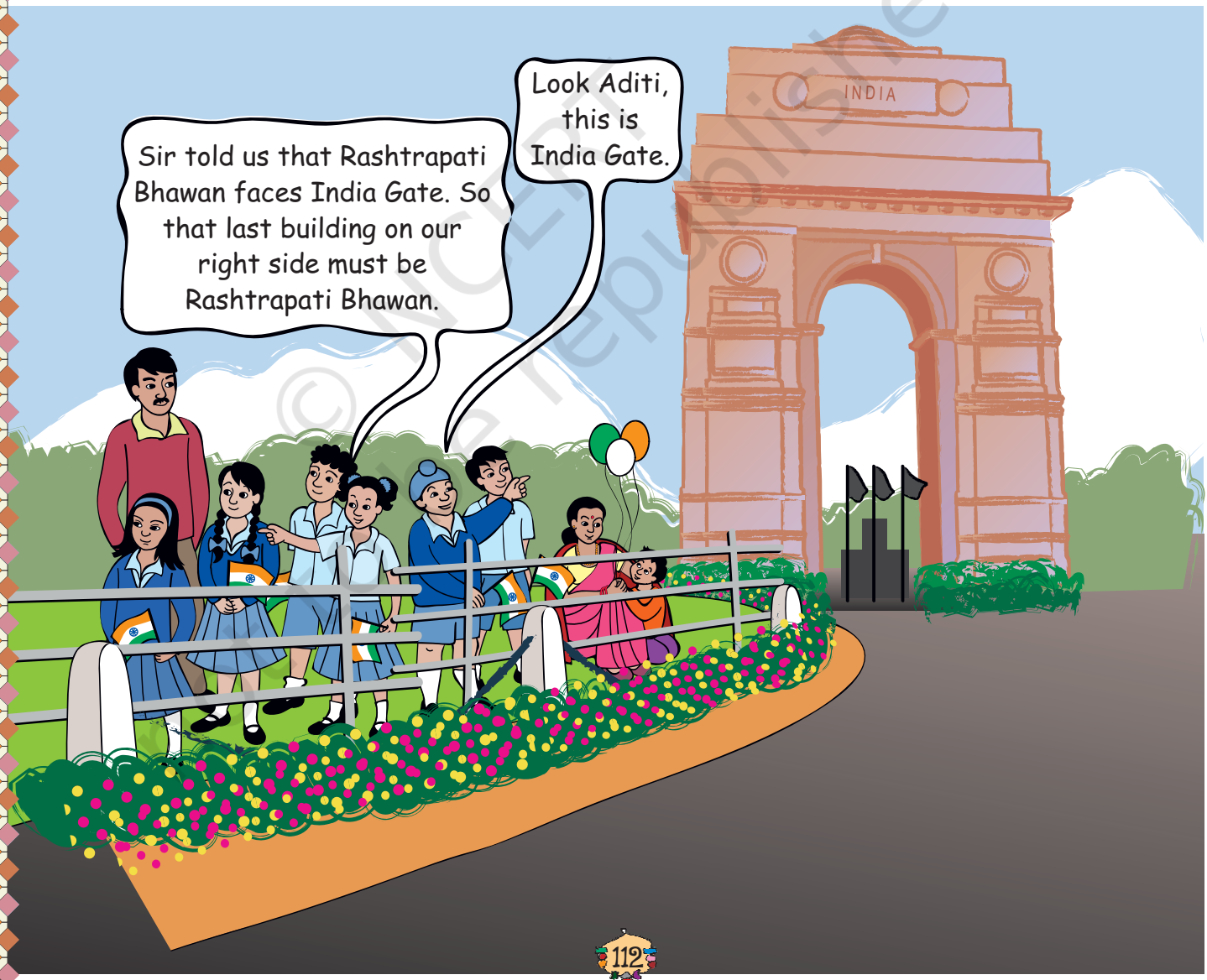
8 Mapping Your Way

0527CH08

Ashi is going to India Gate to see the Republic Day Parade with the other children of her school. As the children settle down, they hear something about India Gate on the loudspeaker. "To the right of the President is the India Gate. This was built in memory of the Indian soldiers who died in the First World War."

There are lots of people sitting on both sides of Rajpath, the main road along which the parade passes. Children are talking about the buildings they can see around them.



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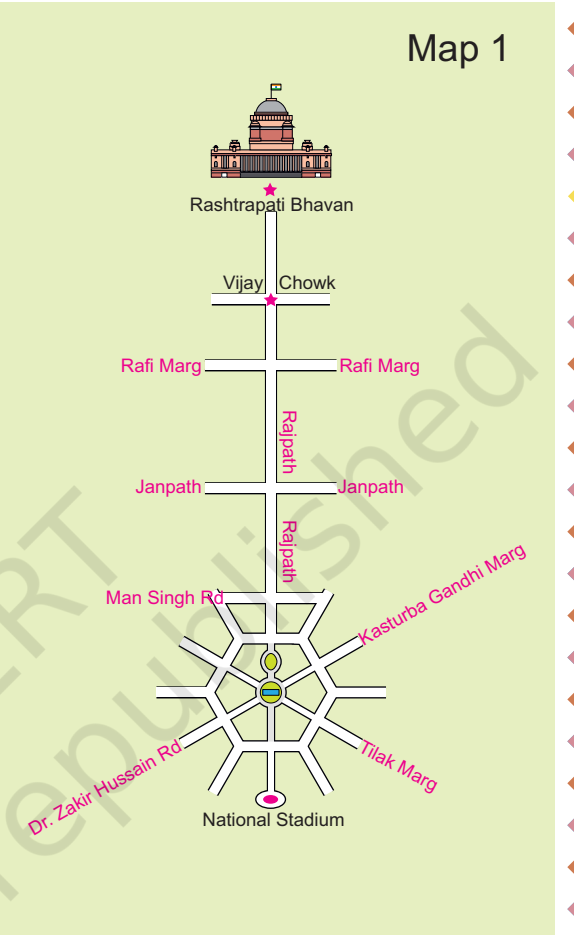
Here is a photograph taken from a helicopter. You can see Rajpath — the road which joins India Gate to Rashtrapati Bhawan. Mark where on Rajpath will Aditi be.



Match the map and the photo

1) Have you seen a map of a city? Look at Map 1. Match it with the photo and find out where India Gate is. Draw it on the map.

2) Some roads are shown in this part of the map. Look for them in the photo.

3) Name roads that you will cross on your way from Rashtrapati Bhawan to India Gate.

4) Look for the National Stadium in Map 1. Can you see it in the photo?

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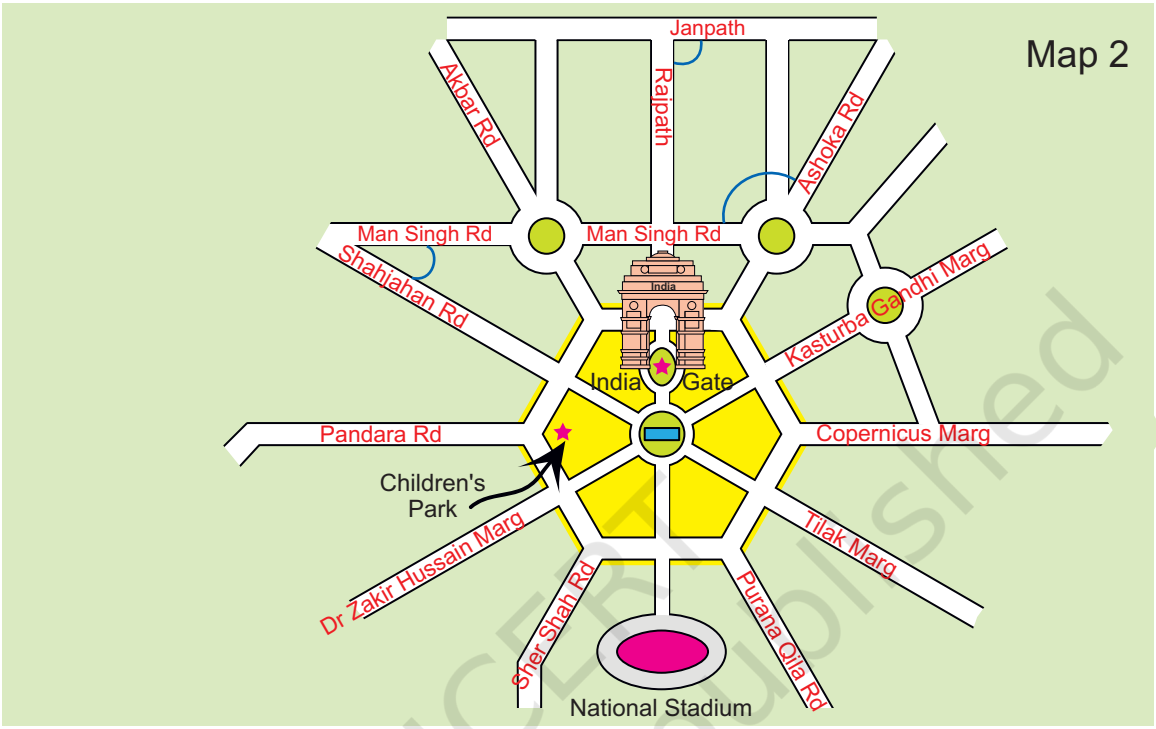
The Central Hexagon

If we 'zoom in' to look more closely at one part of the map, it looks like this.



Look at the shape of the yellow area. Have you seen this shape before? How many sides does it have?

This place is called the Central Hexagon.

Find out from the map

1) If you are walking on Rajpath then after India Gate on which side would Children's Park be?

2) Which of these roads make the biggest angle between them?

   a) Man Singh Road and Shahjahan Road

   b) Ashoka Road and Man Singh Road (the angle away from India Gate)

   c) Janpath and Rajpath

3) Which of the above pairs of roads cut at right angles?

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Waiting for the Parade

While waiting for the parade, Kancha and some of his friends wonder where this parade ends. Kancha is carrying a newspaper in which the route of the parade is written —

Vijay Chowk — Rajpath — India Gate — Tilak Marg — B.S. Zafar Marg — Subhash Marg — Red Fort.

The children look at this map to see the parade route.

Map 3

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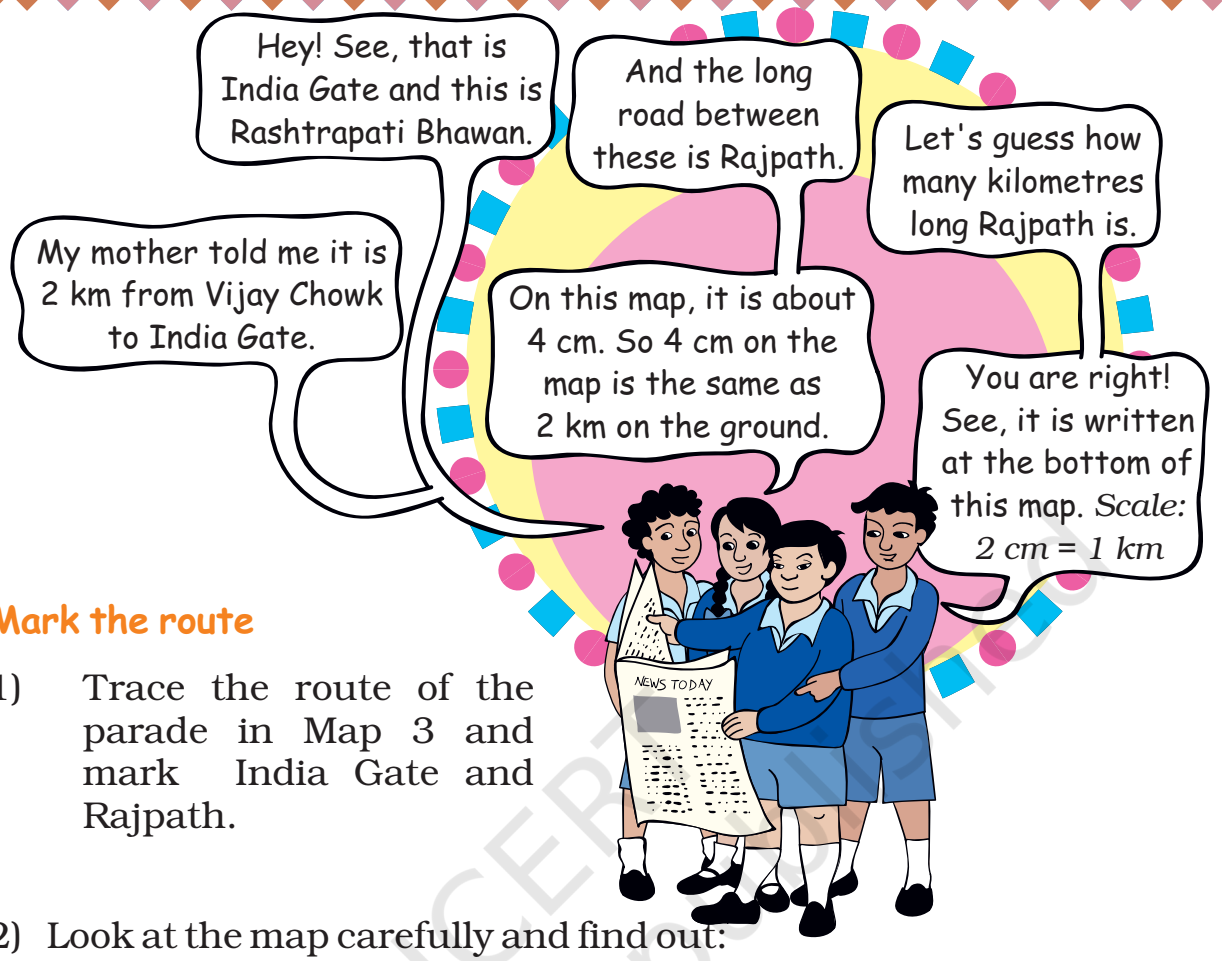

Mark the route

1) Trace the route of the parade in Map 3 and mark India Gate and Rajpath.

2) Look at the map carefully and find out:

   a) Which of these is the longest road?

   ● B.S. Zafar Marg ● Subhash Marg ● Tilak Marg

   b) If Rubia is coming from Jama Masjid to join the parade, guess about how far she will have to walk.

   c) The total route of the parade is about how long?

   ● 3 km ● 16 km ● 25 km ● 8 km

As the parade passes by, they see some children coming on an elephant. These children have got bravery awards. They also enjoy the colourful dances and aerobics by school children.

They want to follow the parade to Red Fort. Gappu has seen Red Fort before and tells them about his trip.

Children should understand the need for a scale. We need to discuss that when we show a big area on paper, we have to reduce it by a fixed ratio everywhere, so that the relative distances and positions remain the same.

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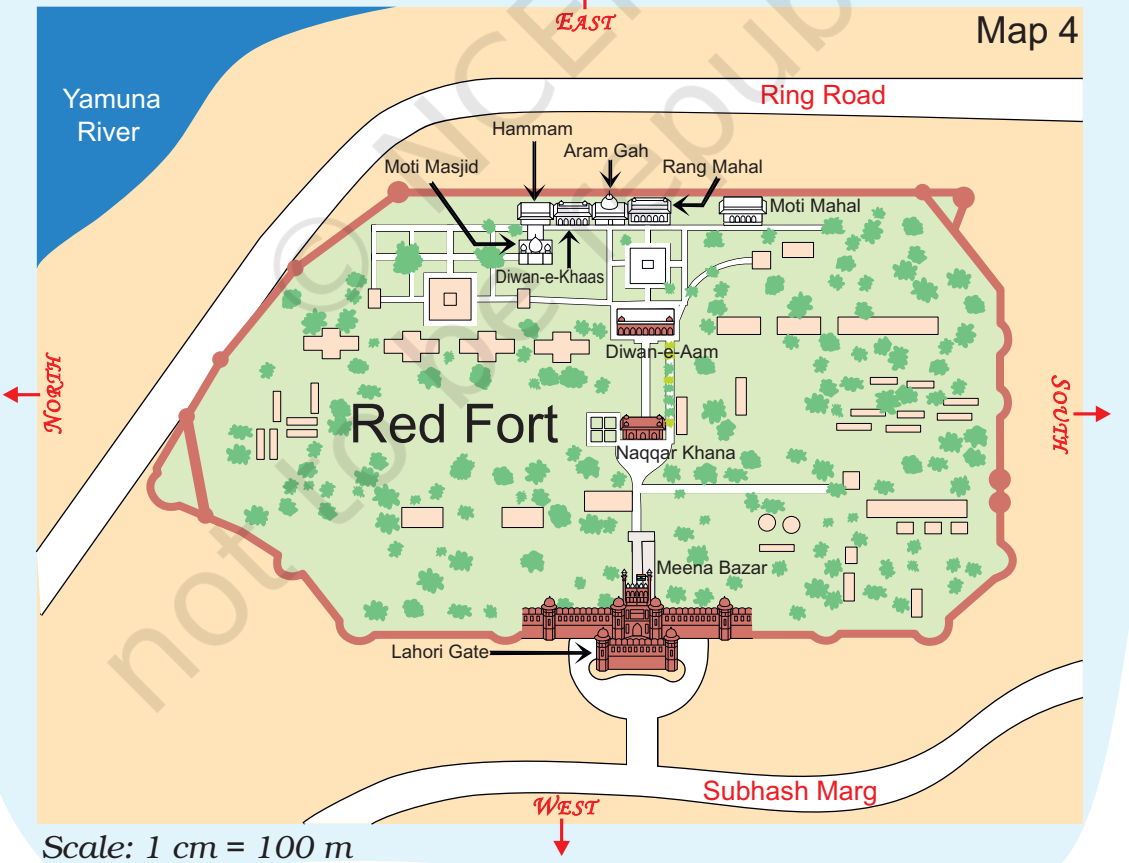
Trip to Red Fort

"When we reached Red Fort, there was a long queue for tickets. The main entrance is called **Lahori Gate**. After entering it, we turned left into a long corridor with little shops on both sides. This is called **Meena Bazar**. I bought some lovely bangles from there for my sister".

Meena Bazar

Lahori Gate



Scale: 1 cm = 100 m

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Naqqar Khana — where drums were beaten to shout out the king's messages

"You can go straight through **Naqqar Khana** and reach **Diwan-e-Aam**. This is where the king used to meet the common people.

Walking straight from **Diwan-e-Aam**, we saw **Rang Mahal**. It is a beautiful building! There were three more buildings on our left side. Look for these on the map.

From the right – Rang Mahal, Aaram Gah and Diwan-e-Khas

We walked left from Rang Mahal. **Diwan-e-Khaas** was where the king used to meet his ministers and other important (khaas) people."

Inside Rang Mahal

Inside Diwan-e-Khaas

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Find out from Map 4

a) Which of these is nearer to river Yamuna? — the Diwan-e-Aam or the Diwan-e-Khaas?

b) Between which two buildings is Aaram Gah?

c) Which buildings do you pass while going from Rang Mahal to the Hammam?

d) Which building on this map is farthest from Meena Bazar?

e) About how far is Lahori Gate from Diwan-e-Khaas?

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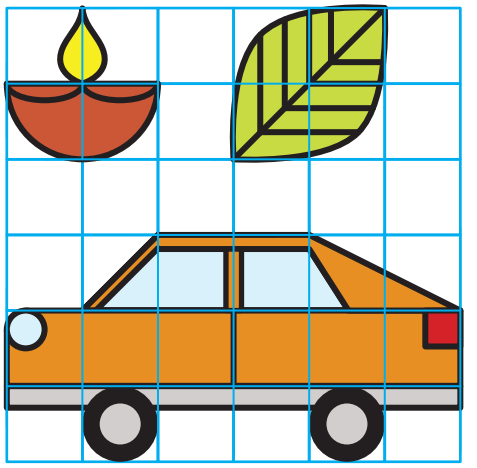
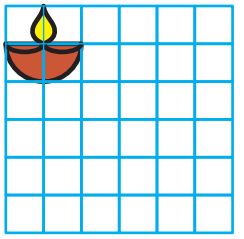
Make It Bigger, Make It Smaller.

Here are some pictures drawn on a 1 cm square grid. Try making the same pictures on a 2 cm grid and also on a $\frac{1}{2}$ cm grid. One picture is already done.

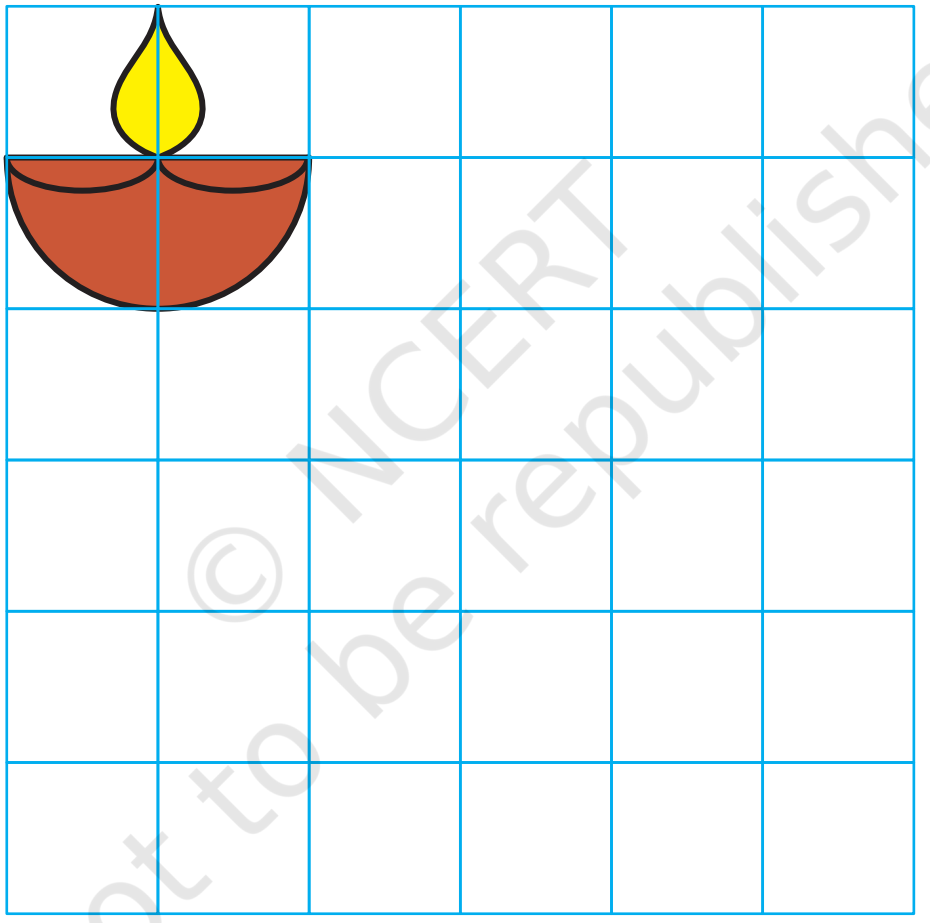
1 cm grid



$\frac{1}{2}$ cm grid



2 cm grid



The side of the square was made two times bigger. Does its area also become two times bigger?

Enlarging or reducing of pictures and maps can be done on the classroom floor, the mud ground etc. This should be related to the use of scale in maps, which keeps the shape the same.

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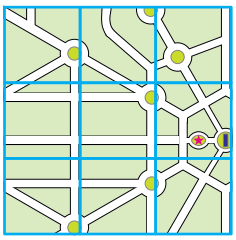
Now try this —

This is a part of the parade-route Map 3.



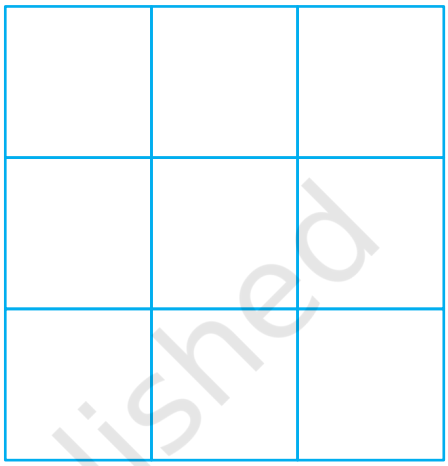
1 cm grid

1) Can you see which part of the route-map it is?

2) Now try to make it bigger in this 2 cm grid. Remember that the 'shape' of the map should not change.

3) If the parade route map is smaller, and the distance between India Gate and Vijay Chowk becomes 2 cm, what would be its scale?

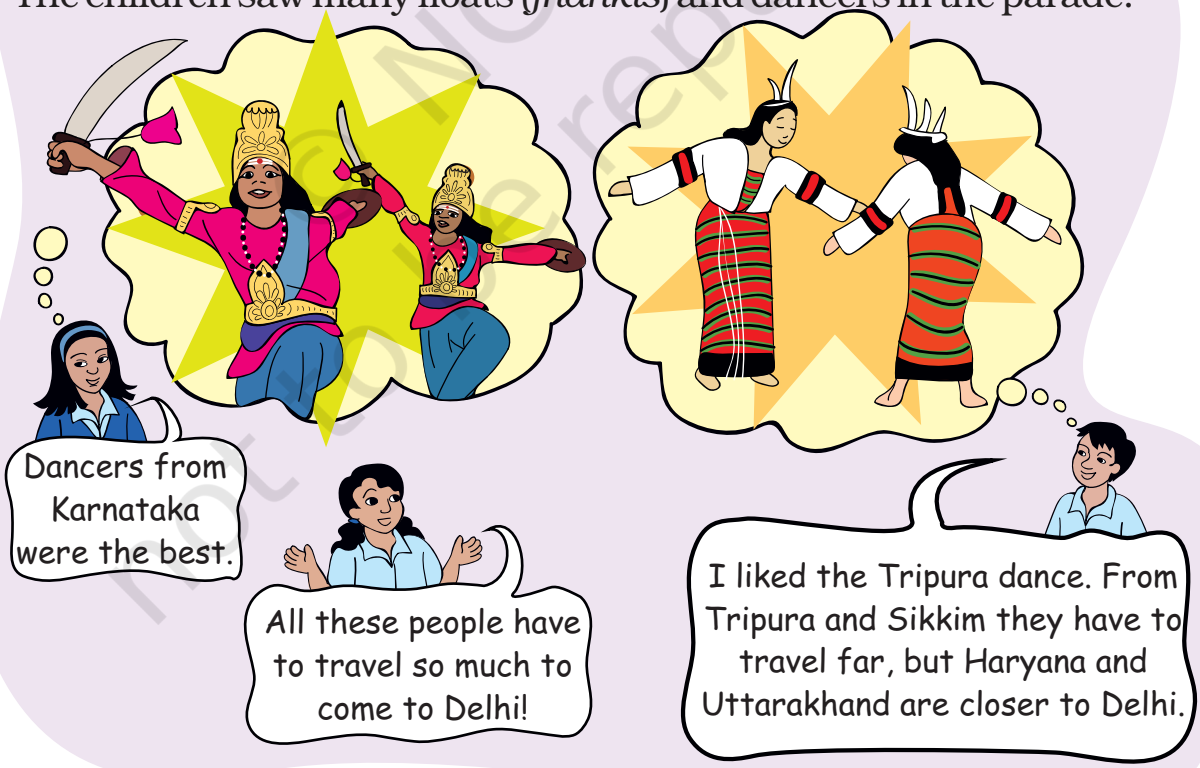
- 1 cm on map = 1 km on ground
- $\frac{1}{2}$ cm on map = 1 km on ground
- 2 cm on map = 1 km on ground



2 cm grid

Dancers from Different States

The children saw many floats (*jhankis*) and dancers in the parade.



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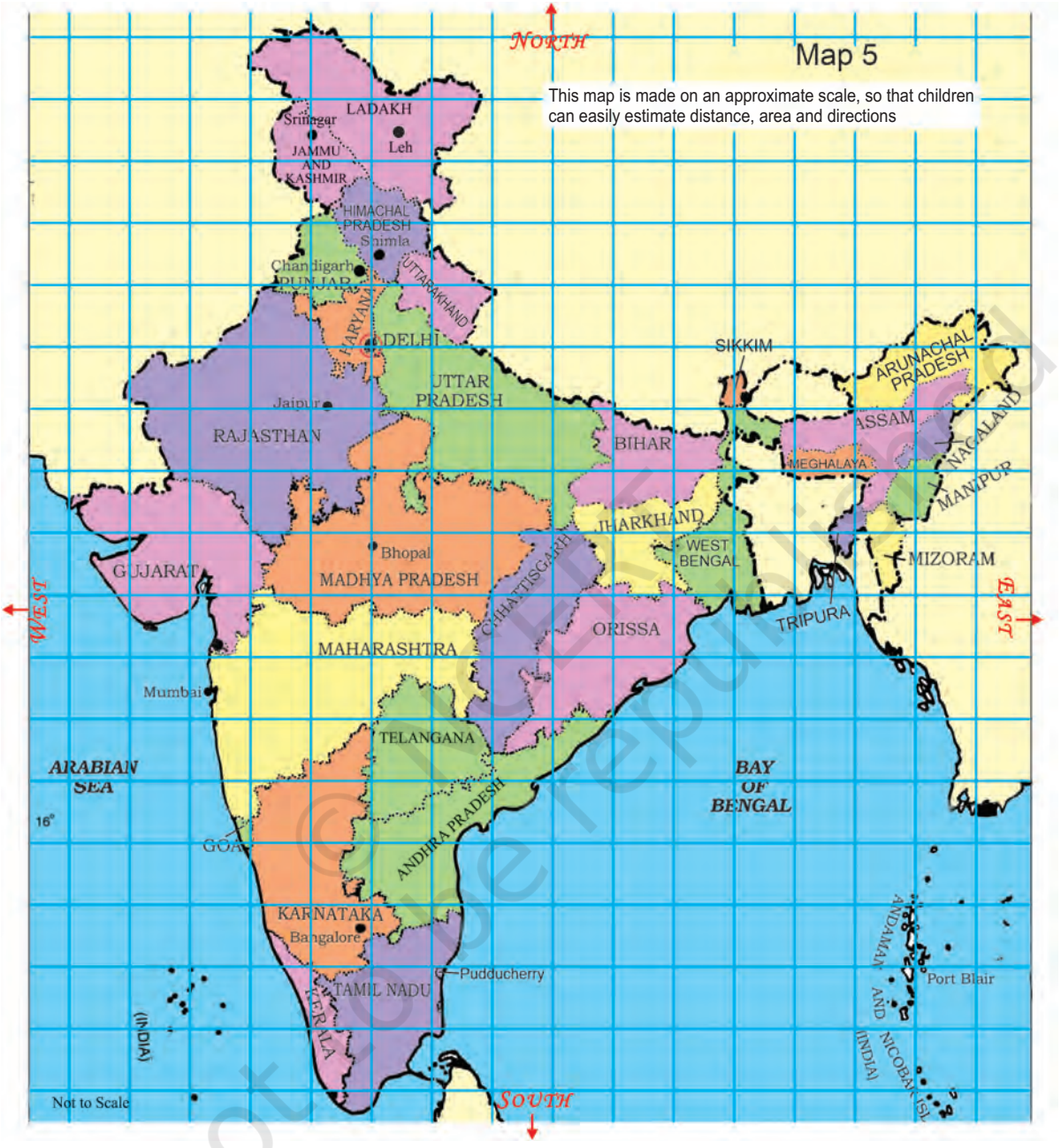
Look at the map of India below and find the states these children are talking about. Answer the questions:



1) The Karnataka team starts from Bangalore and moves in the **north** direction. Which states does it cross to reach Delhi?

As the children are being introduced to directions for the first time, many activities need to be done to use terms like 'towards north', 'southwards', 'in the east direction', 'to the west of Madhya Pradesh' etc. One can draw maps on the floor and get children themselves to stand on the map and say things like Venkat is to the south of Shanti', 'Maharashtra is to the east of Gujarat' etc.

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2) Jammu and Kashmir is to the **north** of Delhi so the team from there travels towards **south** to reach Delhi. Which states does it cross?

3) Nonu lives in Gujarat. Nonu's friend Javed lives in West Bengal. Nonu wants to visit his friend. In which direction will he travel?

a) Towards west
b) Towards east
c) Towards south
d) Towards north

4) Is there any state which is to the north of Jammu and Kashmir?

5) Is there any state which is to the west of Gujarat?

6) If **1 cm on the map shows 200 km on the ground,** use this scale to find out:

A) About how far is Delhi from Jaipur?

a) 50 km b) 500 km c) 250 km

B) Estimate, how far is Jaipur from Bhopal?

On the map = _____ cm.

On the ground = _____ km.

7) Look at the map and tell:

a) Which state is surrounded by four other states?

b) Which state has the largest area? If its name is not in the map, find it from your teacher or parents.

Explain how you got your answer.

c) Which state is about 8 times bigger in area than Sikkim?

- Uttar Pradesh
- Tripura
- Maharashtra
- Himachal Pradesh

d) About how many times of Punjab is the area of Rajasthan?

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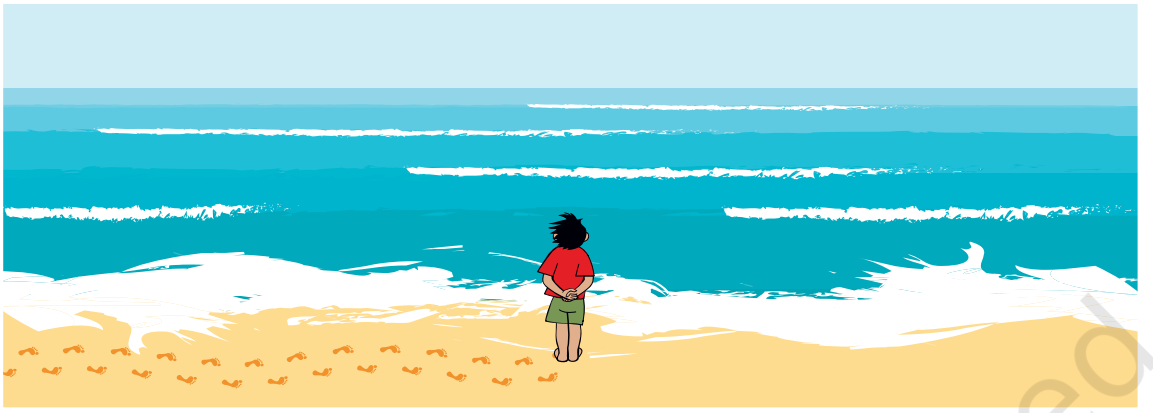
The Sea

Bala is standing on the sea-coast and looking at the vast sea. The sea looks endless .



Have you seen the sea? In the picture where is the sea? Now look for the sea in the map of India. What colour is used to show the sea?

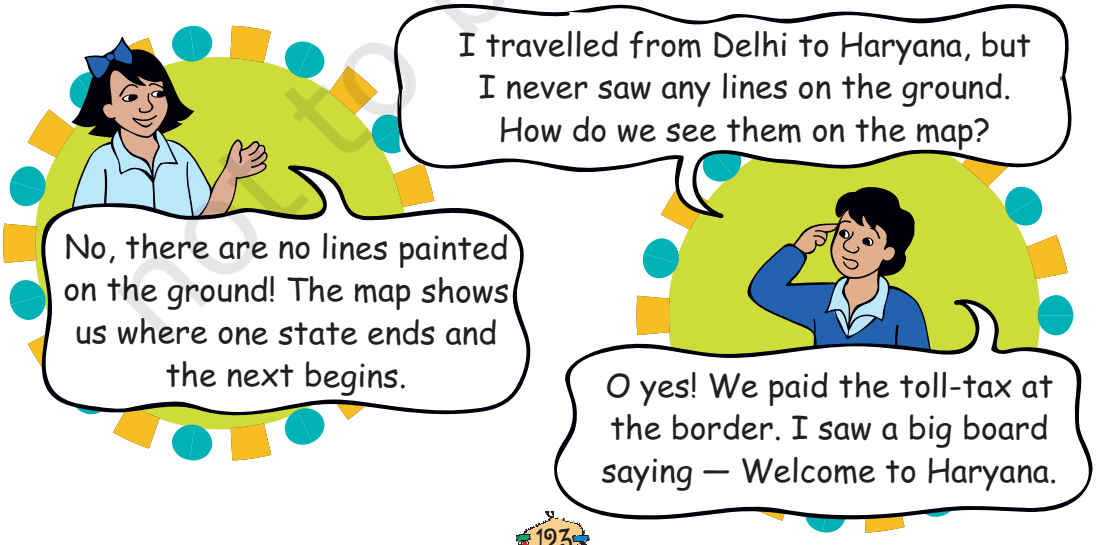
- Mark those states which have the sea on one side.
- Name one state which does not have the sea on any side.

Find out

Look for different maps. Compare the different scales used in a local area map, a map of India and a world map etc.

Lines between the States

Sabu is confused about the lines shown between the states.



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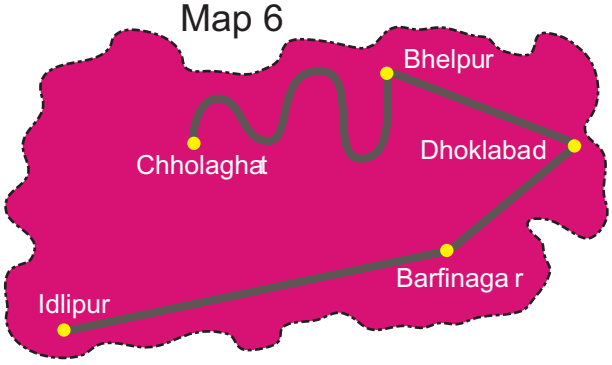
Distances between Towns

Map 6



Scale: 1 cm on the paper = 10 km

These are five towns. Find out:

1) How many cm away is Idlipur from Barfinagar on the map?

2) How many kilometres will you have to travel if you go from Idlipur to Barfinagar?

3) There is a place called Thukpagram midway between Idlipur and Barfinagar. Mark it with a 'T'.

4) A town called Jalebipur is 35 kms away from both Chholaghat and Dhoklabad. Where do you think it can be? Mark 'J' for it.

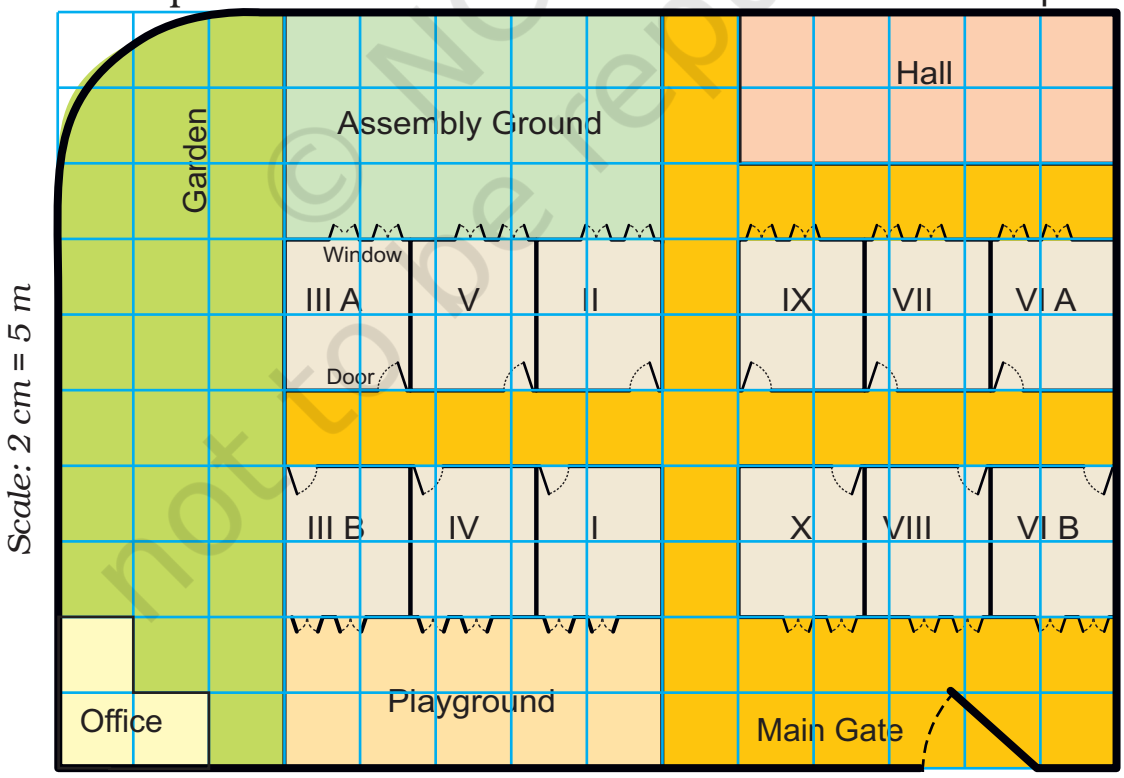
5) Measure the length of the route between Bhelpur and Chholaghat. (You can use a thread)

Ashi's School

Ashi's school looks like this from the top.

Use the squares to find out:

Map 7



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1) How many times bigger is the area of the Assembly ground than that of the office?

2) How much is the length and width of each classroom?

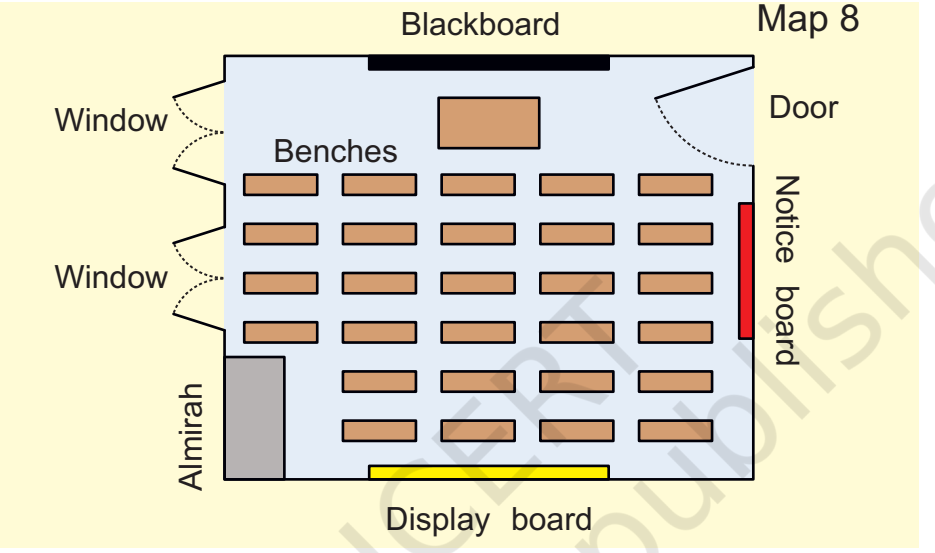
a) length 5 m, width 4 m

b) length 2 m, width 1 m

c) length 12 m, width 10 m

d) length 5 m, width 5 m

3) All the classrooms in Ashi's school look like this.



Look carefully and answer.

a) Which of these is exactly opposite to the blackboard?

- Almirah, windows, notice board, display board

b) Now look at the school-map again. Guess and mark where would these be:

- Blackboard in III A and VII
- Almirah in IV and X
- Notice board in V and VI B
- Last seat of middle-row in II
- Display board in I.

c) Can a child sitting in III A see the playground?

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9 Boxes and Sketches

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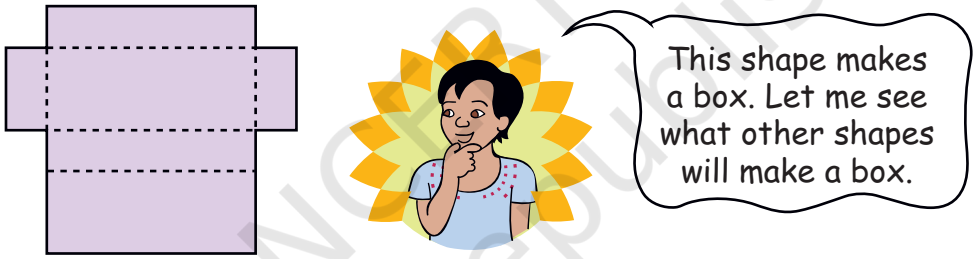
Sweet Box

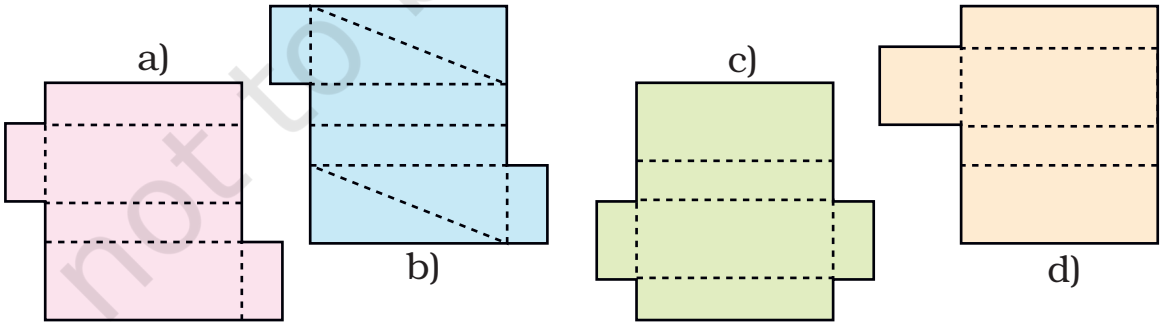
Ramya went to buy sweets. The shopkeeper took a paper cut-out and quickly made a lovely pink box for the sweets!

- Look at the photo and make your own box. Use the cut-out on page 201. How fast can you fold it?

After coming home Ramya unfolded the box. She removed the extra flaps so the cut-out looked like this.



- She made four more shapes. Each is to be folded along the dotted lines. You have to find out which of these can be made into a box.



This chapter focuses on visualisation of 3-dimensional shapes and how they can be represented on paper (in 2 dimensions). The representation used here are nets (like the ones above), layout plans for a house, and perspective drawings.

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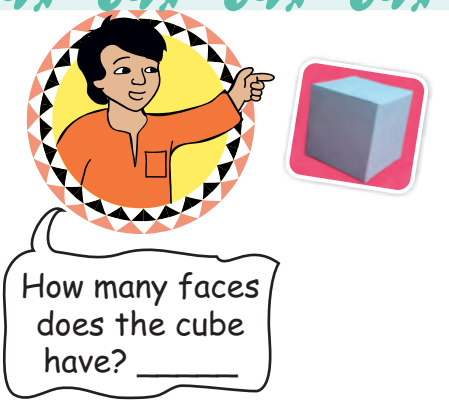
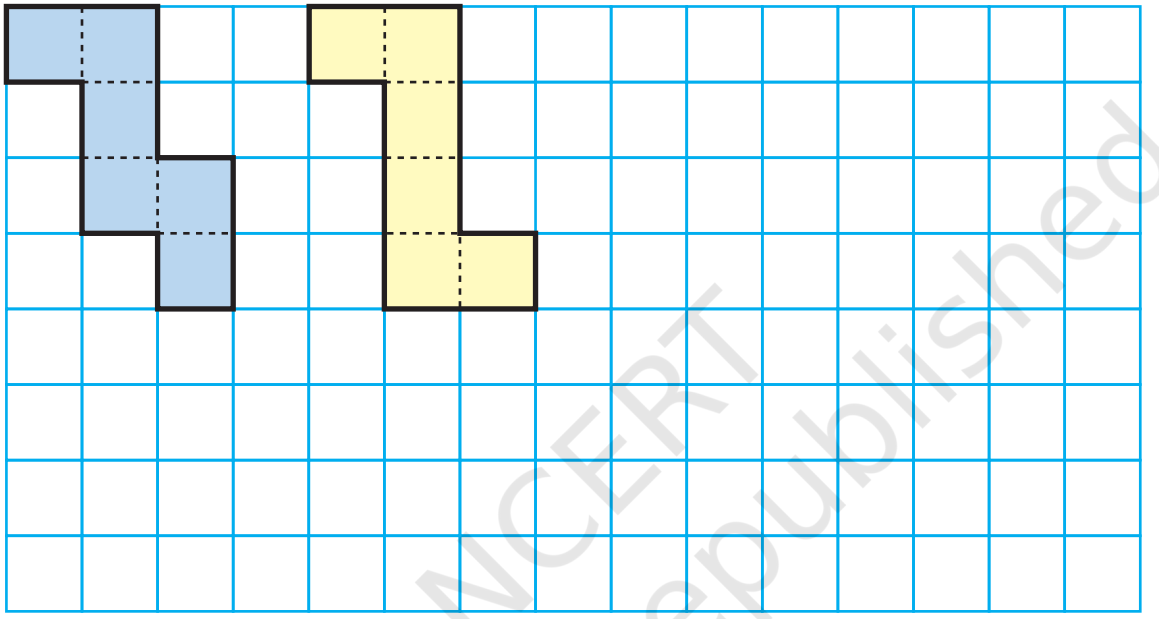
Shapes that Fold into a Cube



A. Buddha wants to make a paper cube using a squared sheet. He knows that all the faces of a cube are squares.

He draws two different shapes.



- Will both these shapes fold into a cube?
- Draw at least one more shape which can fold into a cube.
- What will be the area of each face of the cube?
- Draw one shape which will not fold into a cube.
- Look around and discuss which things around you look like a cube. List a few.

Shapes for an Open Box

Remember the puzzles with five squares in chapter 3? You saw 12 different shapes made with five squares (page 46).

If you cut those shapes and fold them, some of those will fold into an open box (box without a top).

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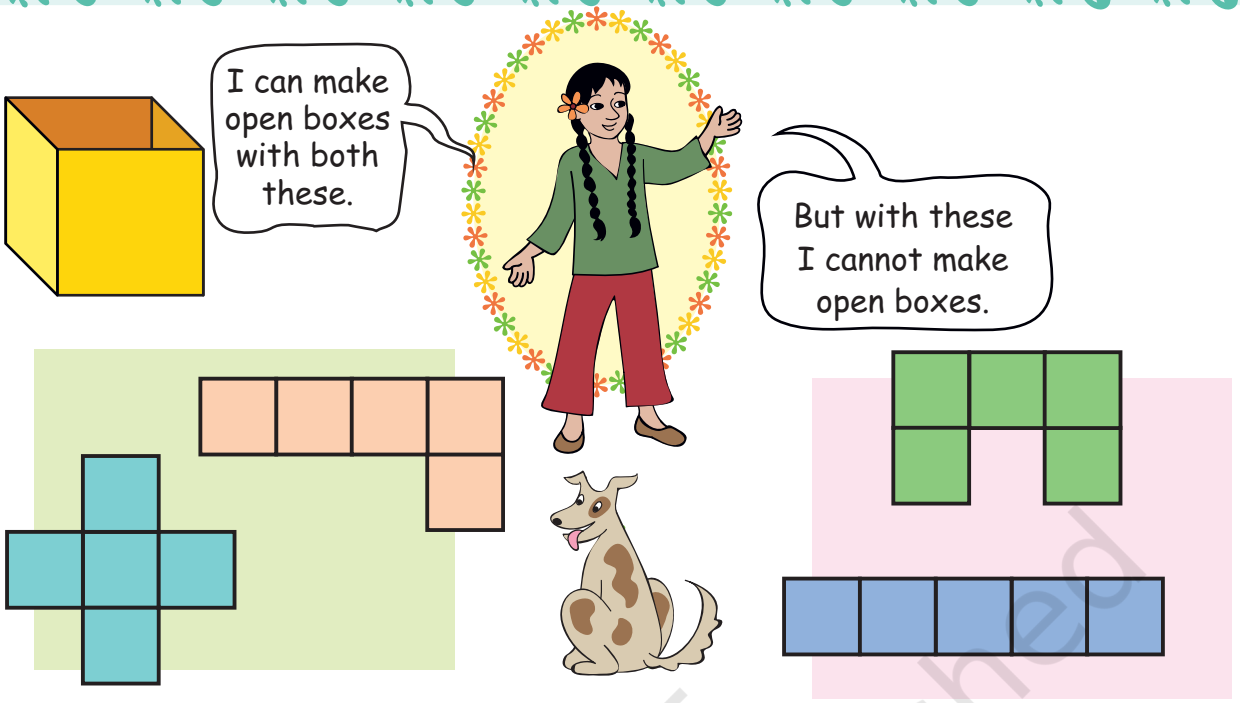
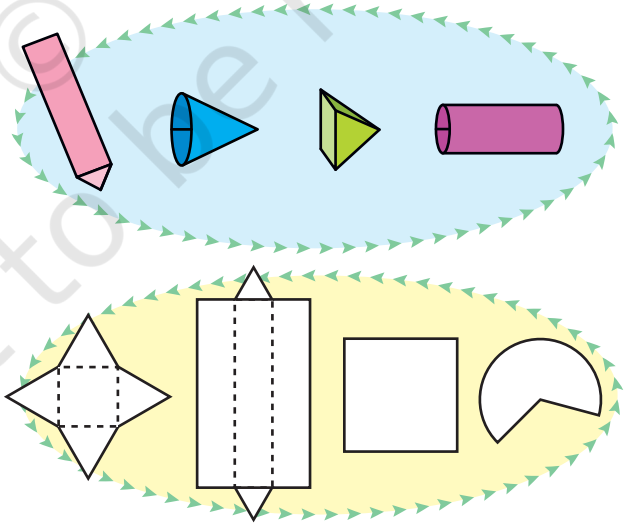


- Find out which of the other 8 shapes (on page 46) can be folded to make an open box.
- Draw more shapes which will not fold to make an open box.

Boxes and Boxes

All boxes are not cubes. Here are some different kinds of boxes. Match the shape on the left with a box into which it will fold.



Making mental images of shapes is an important mathematical ability. Children will need many exercises to visualise the net of a box, to think of how it looks when flattened, and also to check which nets (like those on page 126) do not make a box.

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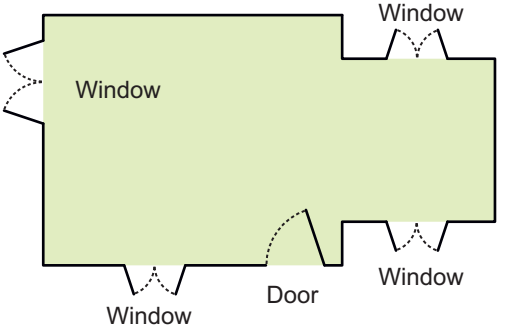
Floor Maps



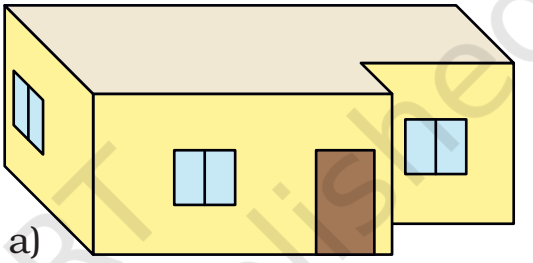
For making a house a floor map is first made. Have you ever seen a floor map? Here is a floor map of Vibha's house. It shows where the windows and the doors are in the house.

❊ Which is the front side of her house? How many windows are there on the front side?

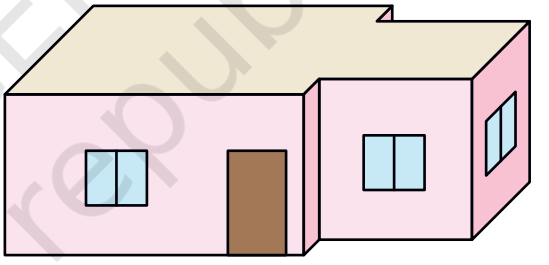
From the floor map we cannot make out what her house really looks like or how high the windows are. So we look for a special way of drawing the house which is deep — to show the length, width and height.

Here are four **deep drawings** of houses.

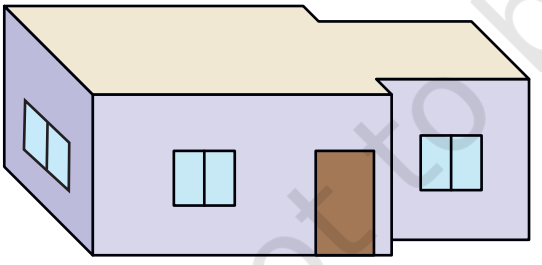
❊ Which one is Vibha's house?



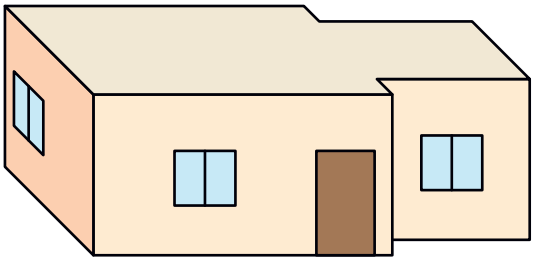
a)



b)



d)



c)

❊ Why do the other three deep drawings not match the floor map? Discuss.

A 3-dimensional perspective drawing has been called a 'deep drawing' so that children get a sense of the need to represent depth. They should be able to see the difference between deep drawings and layout plans.

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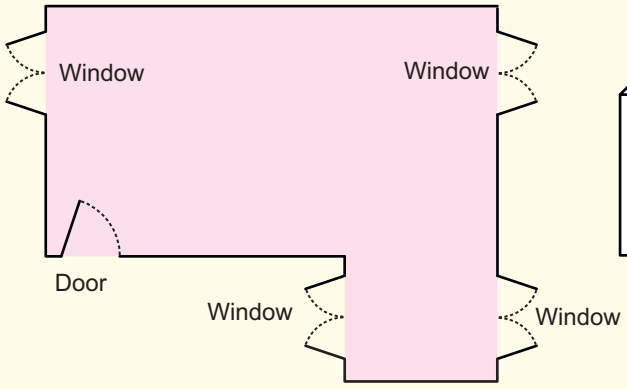
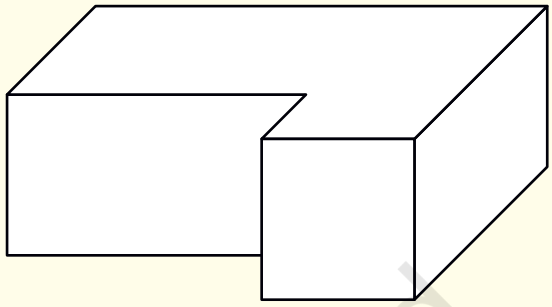
Practice time

1. Look at this floor map of a house. Make doors and windows on the deep drawing of this house.





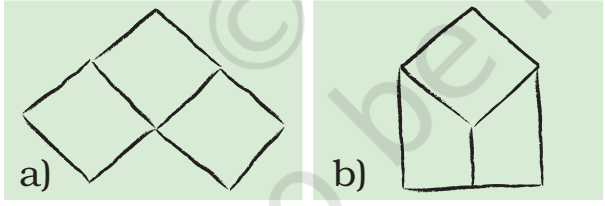
❊ Are there any windows you couldn't show on the deep drawing? Circle them on the floor map.

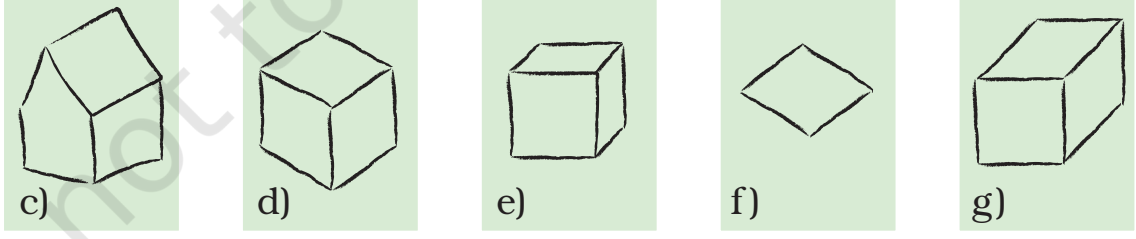
2. Try to make a floor map of your own house.

A Deep Drawing of a Cube

Soumitro and his friends made deep drawings of a cube.

These are their drawings.





❊ Which of the drawings look correct to you? Discuss.

❊ Can you add some lines to make drawing f) into a deep drawing of the cube?

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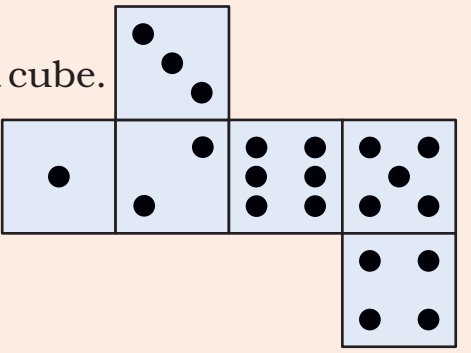
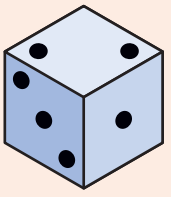
Puzzle

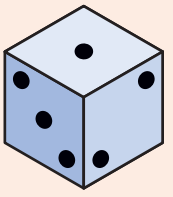
This cut-out is folded to make a cube.



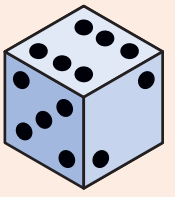
Which of these are the correct deep drawings of that cube?



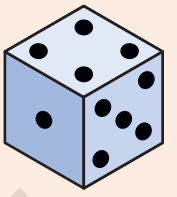
a)



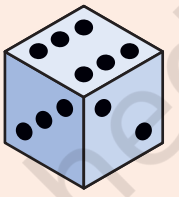
b)



c)



d)

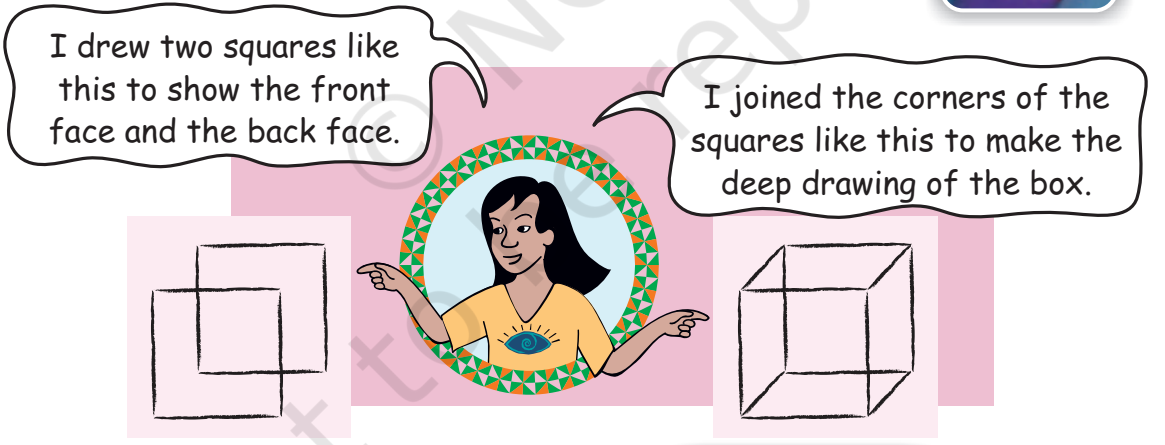


e)

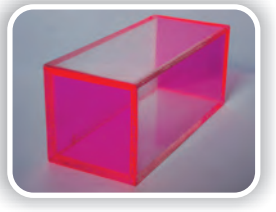
A Simple Way to Draw a Cube

Chanda wants to make a deep drawing of this cube.

She draws the cube like this.



❊ In the same way make a deep drawing of a box which looks like this.



The 2D representation of 3D objects is a matter of convention and is learnt by children through experience. Here the conventional way of drawing the cube is given.

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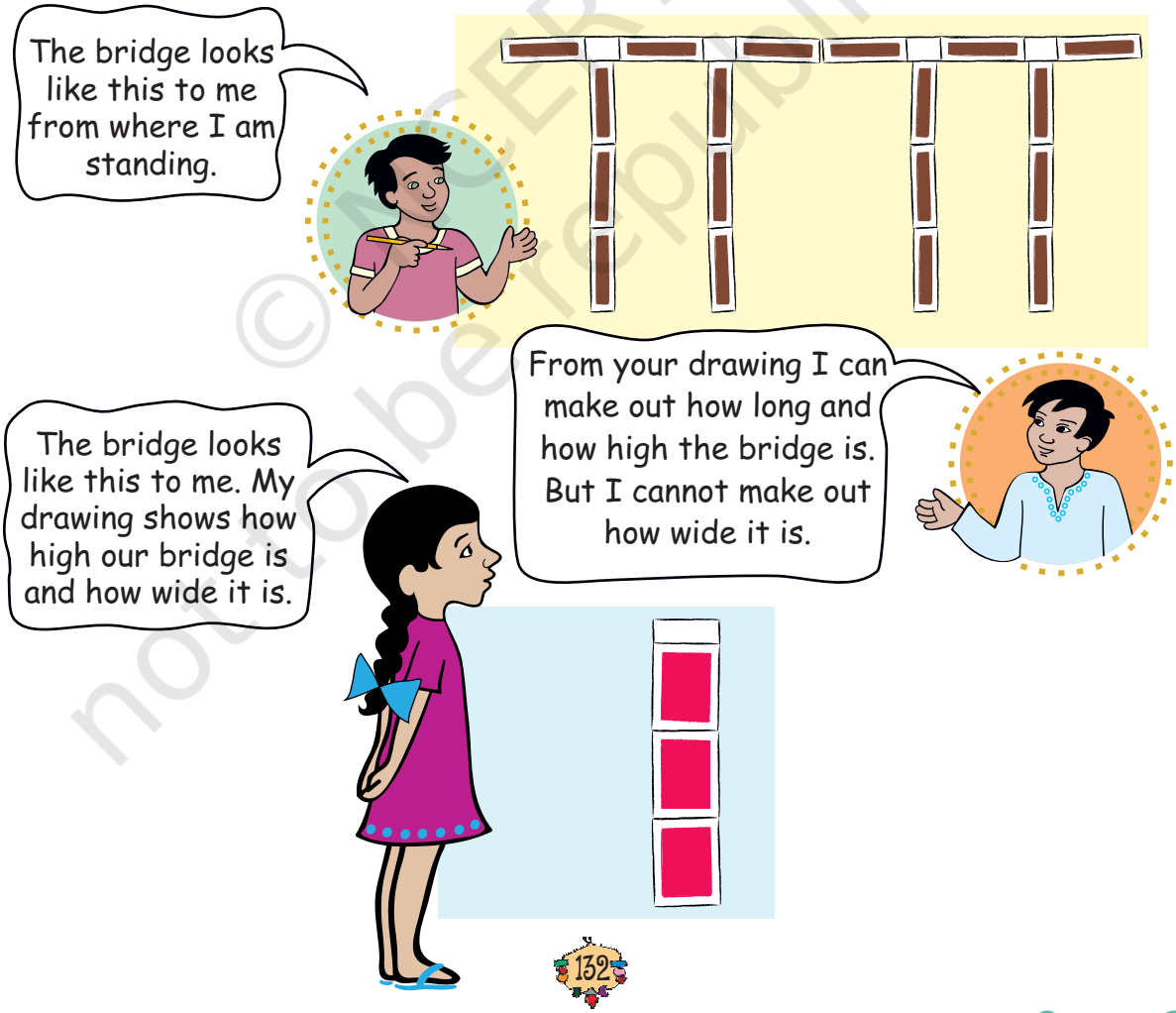
Matchbox Play

Navin, Bhaskar and Pratigya made this bridge using matchboxes.

Navin and Pratigya made drawings of the bridge.



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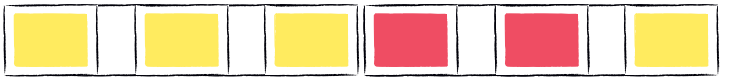
❊ If you look at the bridge from the top, how will it look? Choose the right drawing below:

a)

b) 

❊ Look at the photo and try to make a deep drawing of this bridge.

Practice time

1) Make drawings to show how this bridge will look

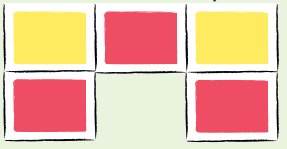
❊ From the top

❊ From the front

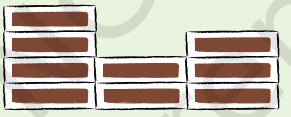
❊ From the side

2) Make a matchbox model which looks like this.

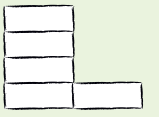
From the top



From the front

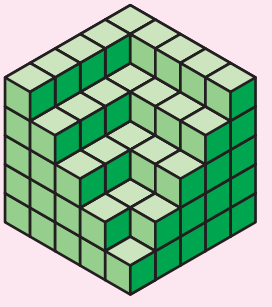


From the side

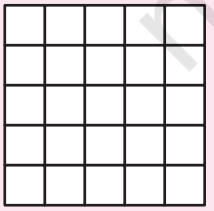


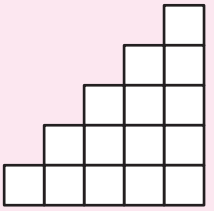
❊ Also make a deep drawing of the model in your notebook.

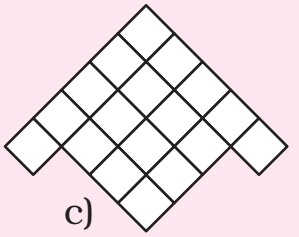
3) How many cubes are needed to make this interesting model?

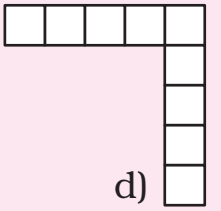


❊ Here are some drawings of the model. Mark the correct top view drawing with 'T' and the correct side view drawing with 'S'.

a) 

b) 

c) 

d) 

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10 Tenths and Hundredths

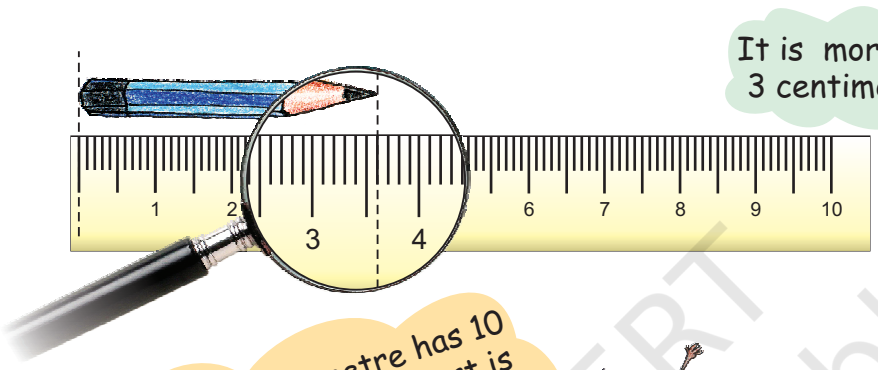
0527CH10

What was the length of the smallest pencil you have used?

How long is this pencil ? Guess _____ cm

Measure it using a scale. How good is your guess?

We can see that Anju used a lens to make it look bigger.

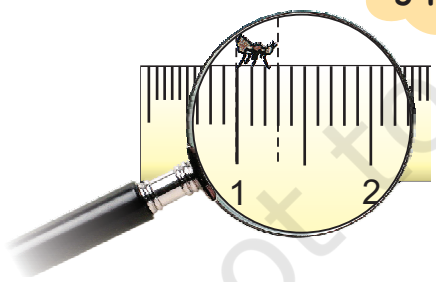


It is more than 3 centimetres.

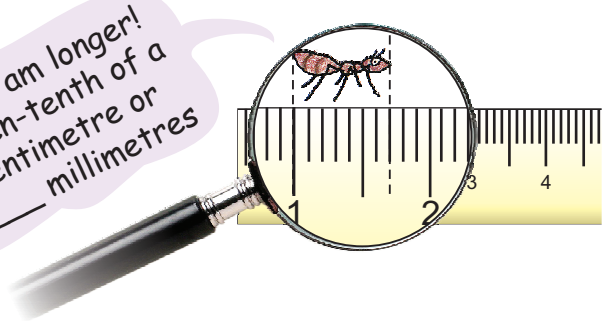
Here one centimetre has 10 equal parts. So each part is one-tenth of a centimetre. One-tenth of a centimetre is called one **millimetre (mm)**.

Oh, so this pencil is 3 centimetres and 6 millimetres long.

See I am 3 mm long!



But I am longer! Seven-tenth of a centimetre or ___ millimetres



We also call one-tenth of a centimetre as 0.1 centimetre. We read it as 'zero point one centimetre'.

So one **millimetre** is the same as 0.1 cm.

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❊ What is the length of this pencil? _____ mm.
What is its length in centimetres?

Frogs

Have you seen frogs? Where? How many different types of frogs have you seen? Are all the frogs of the same length? Here are two interesting examples.

Gold Frogs

This kind of frog is among the smallest in the world. Its length is only 0.9 cm !

Guess how many such frogs can sit on your little finger!

Bull Frog

But this is among the biggest frogs. It is as long as 30.5 cm!

What does 0.9 cm mean? It is the same as ____ millimetres. We can also say this is nine-tenths of a cm. Right?

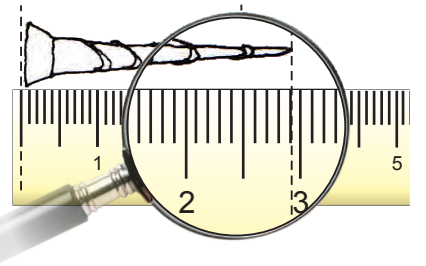
So 30.5 cm is the same as ____ cm and ____ millimetre.

About how many of the big frogs will fit on the 1m scale? _____

If they sit in a straight line about how many of the small frogs will cover 1m? _____

Practice time

1) Length of the nail is 2 cm and ___ mm or 2. ___ cm.



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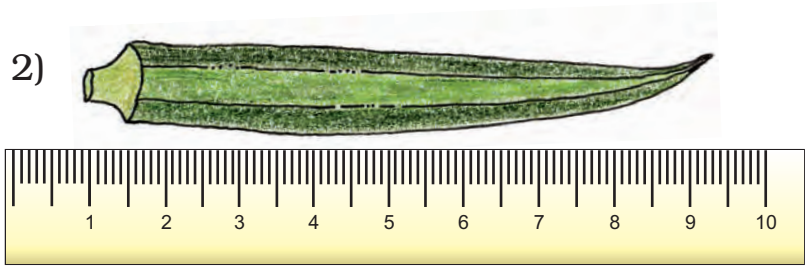
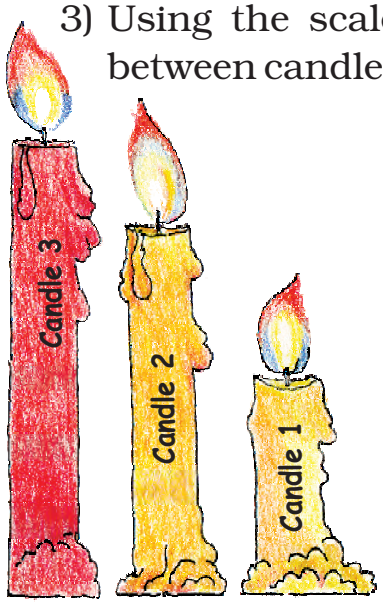
2)



The length of this lady's finger *(bhindi)* is _____ cm and _____ mm.
We can also write it as _____ cm.

3) Using the scale on this page find the difference in length between candle 1 and candle 3.

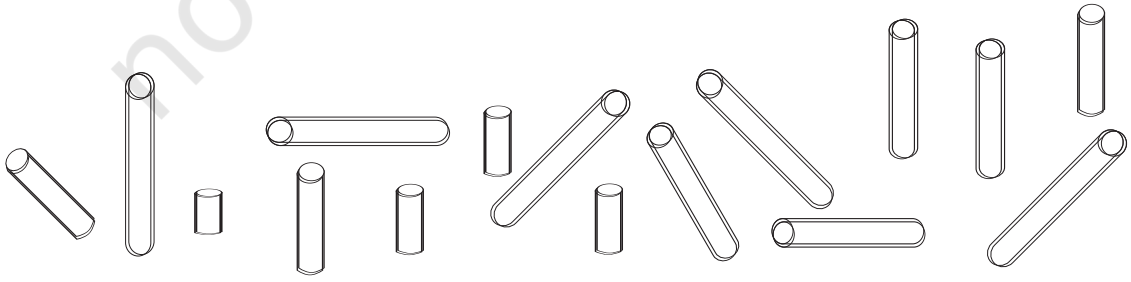


Length of	*Length in cm and mm*	*Length in cm*
Candle 1		
Flame 1		
Candle 2		
Flame 2		
Candle 3		
Flame 3		

Guess and Colour

First colour the rods as shown, without measuring! Then check.

Rods of length less than 1 cm	**Red**
Rods of length between1 cm and 2 cm	**Blue**
Rods of length between 2 cm and 3 cm	**Green**
Rods of length between 3 cm and 4 cm	**Orange**



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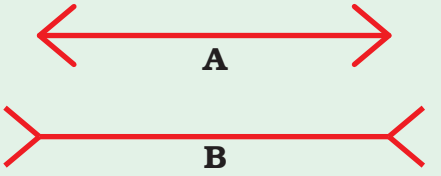
Guess, Draw and Measure

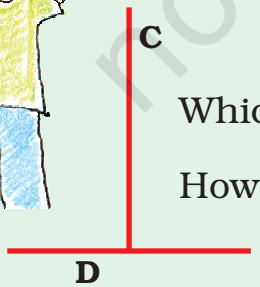
Guess the lengths to draw these things. Ask your friend to draw the same. After you make the drawing use a scale to measure the length. Whose drawing showed a better guess?

Guess its length and draw	*Measure of your drawing*	*Measure of your friend's drawing*
An ant of length less than 1 cm		
Pencil of length about 7 cm		
A glass 11 cm high with water up to 5 cm		
A bangle of perimeter 20 cm		
A curly hair of length 16 cm		

Our Eyes Get Confused?

Which line is longer? A or B ? Measure each line and write how long it is in centimetres. How good is your guess?





Which line is longer? C or D ? Measure each line.

How good is your guess?

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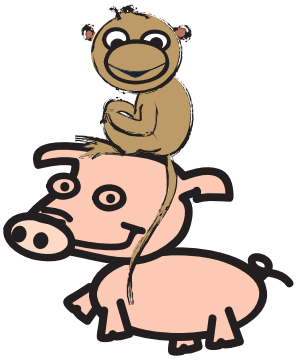
Whose Tail is the Longest?

Guess whose tail is the longest. Now measure the tails. How good is your guess?



The Longest Rupee Notes?

What is the length of a 100 rupee note? Guess. Now measure it using a scale.

Now guess the length and width of many other things. Measure and find the difference between your measure and your guess.

Size of	*Your guess in cm*		*Your measure in cm*	
	length	*width*	*length*	*width*
100 Rupee note				
10 Rupee note				
20 Rupee note				
5 Rupee note				
Post card				
Math-Magic book				

At the market

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1) How many paise does a matchbox cost? _____

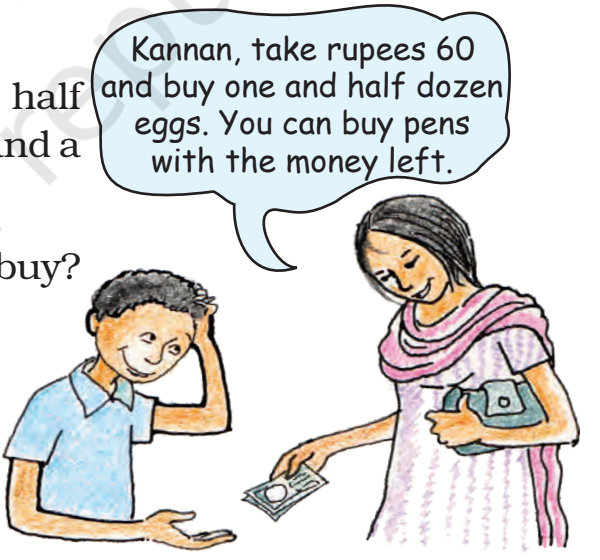
2) How many matchboxes can be got for ₹ 2.50? _____

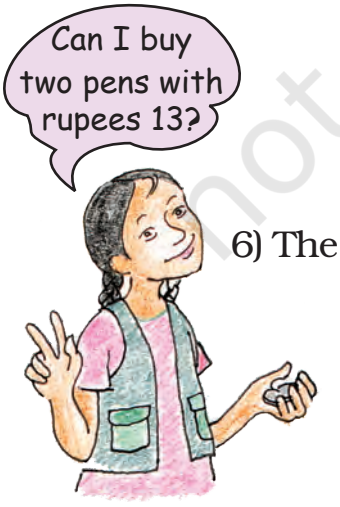
3) How many rupees does the soap cost? _____

4) Arun wanted to buy a soap. He has a five-rupee coin, 2 one-rupee coins and 4 half-rupee coins. Write in rupees what money he will get back.

5a) An egg costs two and a half rupees. How much will one and a half dozen cost?

b) How many pens can Kannan buy? How much money is left?





6) The price of two pens is ₹ _____. Can she buy two pens?

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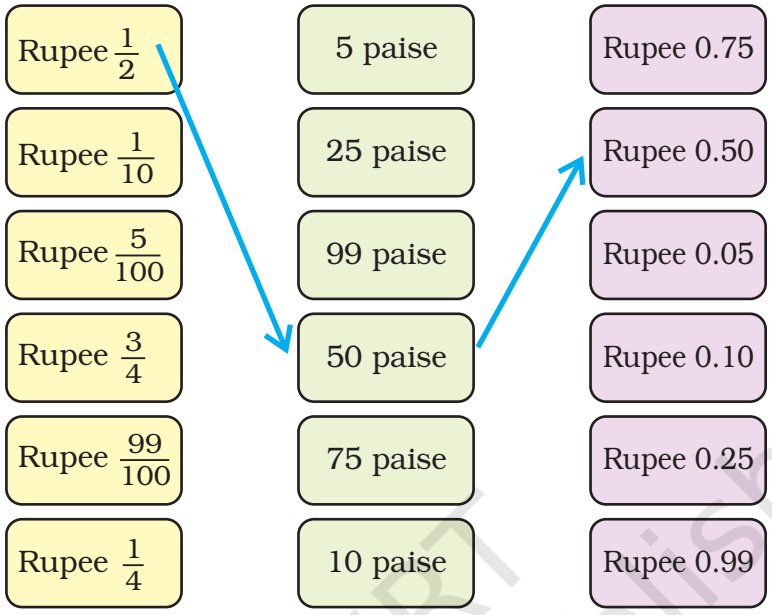
Practice time — Match these

Match each yellow box with one green and one pink box.

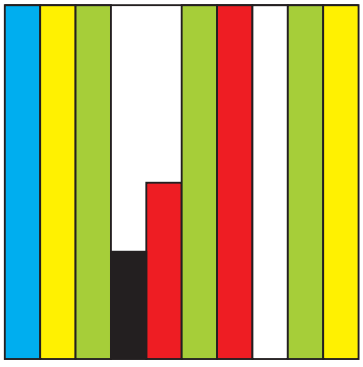


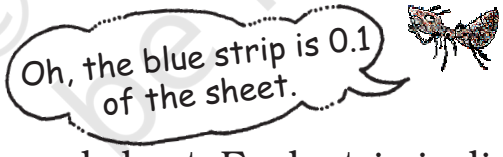
Colourful Design

What part of this sheet is coloured blue? ___/10

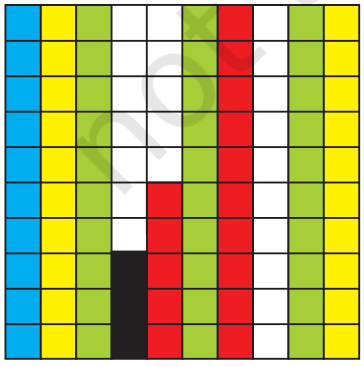
What part of the sheet is green? _____

Which colour covers 0.2 of the sheet?





Now look at the second sheet. Each strip is divided into 10 equal boxes. How many boxes are there in all?



Is each box 1/100 part of the sheet?

How many blue boxes are there? _____

Is blue equal to 10/100 of the sheet? We saw that blue is also equal to 1/10 of the sheet. We wrote it as 0.1 of the sheet.

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Can we say 10/100 = 1/10 = 0.10 = 0.1?

Think: Can we write ten paise as 0.1 of a rupee?

How many boxes are red? What part of the sheet is this? 15/____

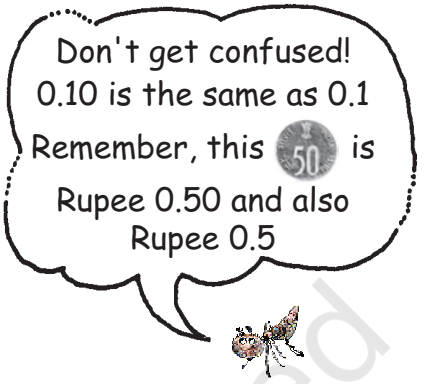
Can we also write it as 0.15 of the sheet ?

(***Hint:*** *remember we wrote 99 paise as 0.99 rupee!)*

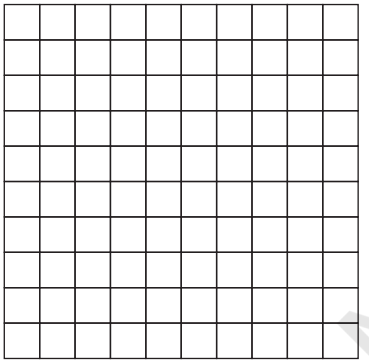
Now 3/100 of the sheet is black. We can say 0.____ sheet is black.

How many white boxes are there in the sheet?

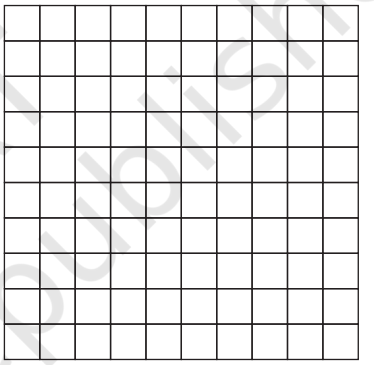
What part of the second sheet is white? ____



❊ Make your designs.



Make a nice design by colouring 0.45 part of this square red.



Use four colours. Each colour should cover 0.05 of this square.

Sports Day

The school at Malappuram has its sports day.

The first five children in the Long Jump are:

Who is the winner in the long jump? _____

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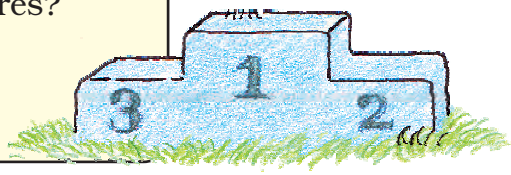
Write the names of the I, II and III winners on this stand.

Do you remember that 1 metre = 100 centimetres?

So one centimetre is 1/100 of a metre.

We also write 1 cm as _____ m



Write in Metres

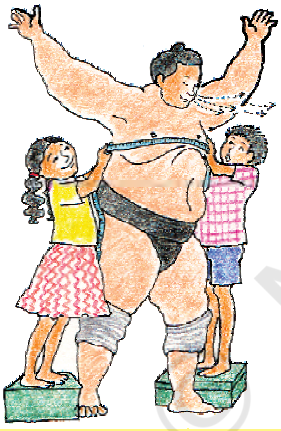
3 metre 45 centimetre ☐ metres

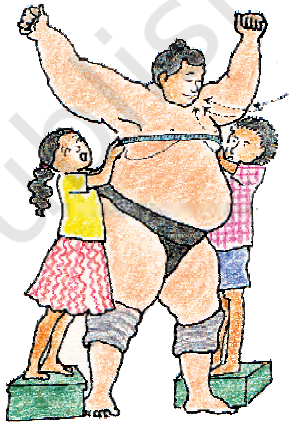
99 centimetre ☐ metres

1 metre and 5 centimetre ☐ metres

How Big Can You Get

A)





After breathing out 1.52 m

On taking a deep breath 1.82 m

Difference in size ☐

Do this for yourself and find the difference.

B)

You have to grow 45 cm more to reach 2 m height

What is Dinesh's height in metres?

_____ m _____ cm.

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Practice time

1) Currency from different countries

Have you seen any notes or coins used in any other country?

Shivam Bank has a chart to show us how many Indian rupees we can get when we change the money of different countries.

Country	*Money*	*Changed into Indian Rupees*
Korea	Won	0.04
Sri Lanka	Rupee (LKR)	0.37
Nepal	Rupee (NPR)	0.63
Hong Kong	Dollar (HKD)	5.10
South Africa	Rand	5.18
China	Yuan	5.50
U.A.E.	Dirham	10.80
U.S.A.	Dollar	39.70
Germany	Euro	58.30
England	Pound	77.76

(This is the rate on 15-2-2008)

A) The currency of which country will cost the most in Indian Rupees?

B) Mithun's uncle in America had sent him 10 USA dollars as a gift. Mithun used 350 rupees for a school trip. How much money was left with him?

Children are not expected to carry out long multiplication involving decimals. Instead, encourage them to think in terms of currency. For example, 75 paise × 2 can be thought of as two 50 paisa coins and two 25 paisa coins.

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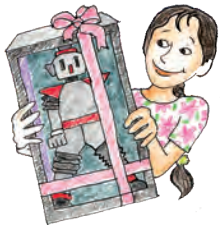
C) Majeed's father is working in U.A.E. He gets 1000 Dirham as salary. Arun's father who is working in Sri Lanka gets 2000 Sri Lankan Rupees. Who gets more Indian rupees as salary?



D) Leena's aunty brought a present for her from China. It cost 30 Yuan. Find what it costs in Indian rupees.

E) Astha wants some Hong Kong Dollars and Won.

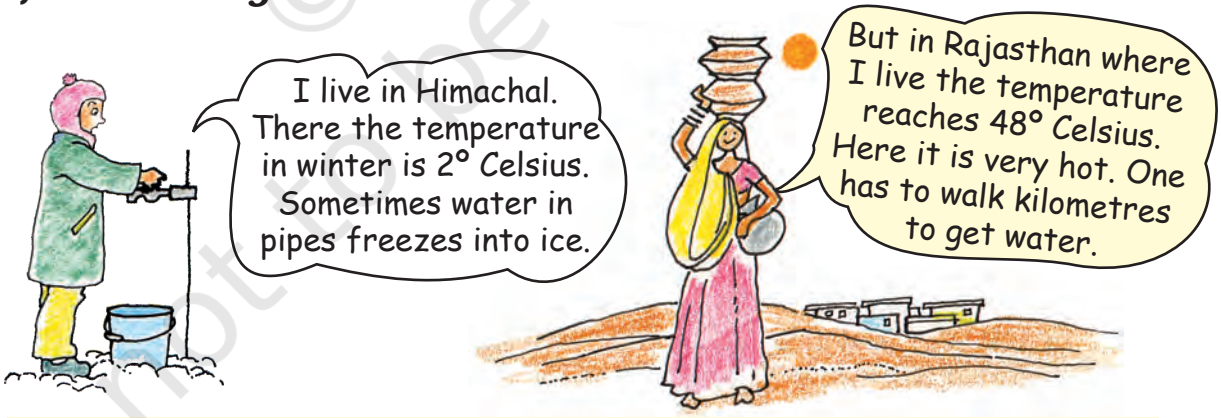
1) How many Won can she change for ₹ 4? For ₹ 400?

2) How many Hong Kong Dollars can she change for ₹ 508?

2) Kiran went shopping with ₹ 200. Look at the bill. The shopkeeper forgot to put the point correctly in the prices. Put the point in the correct place and find out the total amount of the bill.

Item	*Quantity*	*Price (Rupees)*
Soap	1	1250
Green gram	1 kg	5025
Tea	250 gm	2725
Coconut Oil	1 Litre	6000
	Total	_____

3) *Which city is cool?*



Children can be encouraged to look at temperatures (in degree Celsius or °C) of different cities in the newspaper and on TV. Without using the terms 'maximum' and 'minimum' this exercise will give them an idea that temperatures can be measured at two different times of the day. Only simple subtractions using decimals have been used here. They will also get familiar with the names of different capital cities and can do similar exercises for the capital cities of other countries.

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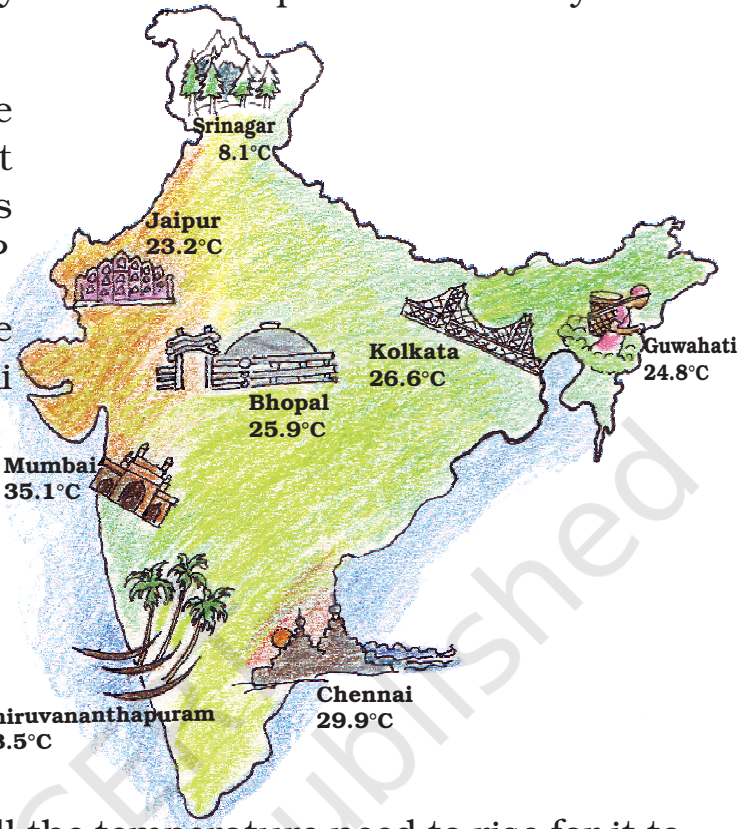
The temperature in each city was noted at 3 pm on 16 January 2008.



1) Which place had the highest temperature at 3 pm? Which place is the coolest at that time?

2) How much higher is the temperature in Mumbai from that in Srinagar?

3) How many degrees will the temperature need to rise for it to reach 40° C in Thiruvananthapuram?

4) How much lower is the temperature of Kolkata from that in Chennai?

5) The temperature in these cities was also noted at 3 am on the same day. Look at the table and answer the questions.

City	*Temperature at 3 am*
Chennai	21.1
Mumbai	19.0
Th'puram	21.6
Kolkata	13.1
Bhopal	9.8
Srinagar	1.3
Guwahati	12.8
Jaipur	10.2

a) Which place had the lowest temperature at 3 am? Imagine yourself to be there and describe how it would feel.

b) What is the difference between the temperatures at 3 pm and 3 am in Chennai? In Bhopal?

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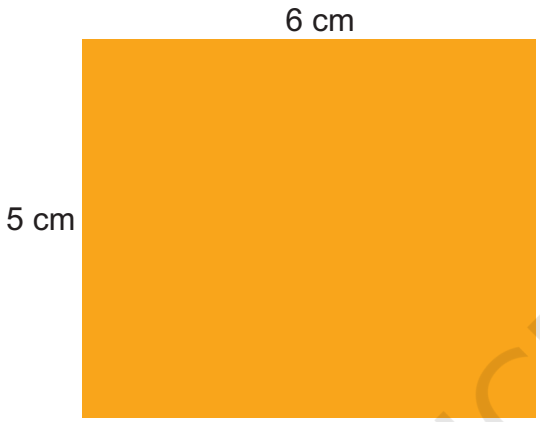
0527CH11

11 Area and its Boundary

Whose Slice is Bigger?

Parth and Gini bought *aam paapad* (dried mango slice) from a shop.

Their pieces looked like these.

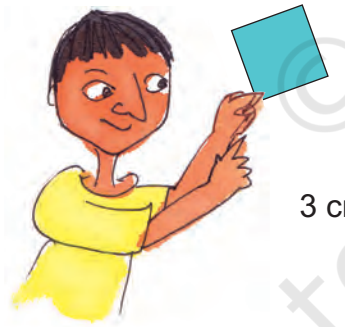


Piece A

Both could not make out whose piece was bigger.

❊ Suggest some ways to find out whose piece is bigger. Discuss.

A friend of Parth and Gini showed one way, using small squares.



Piece B

The length of piece A is 6 cm.

So 6 squares of side 1 cm can be arranged along its length.

The width of piece A is 5 cm.

So 5 squares can be arranged along its width.

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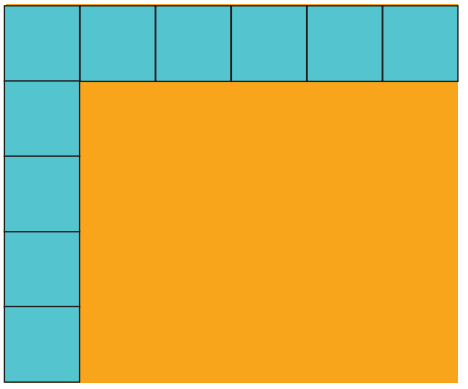
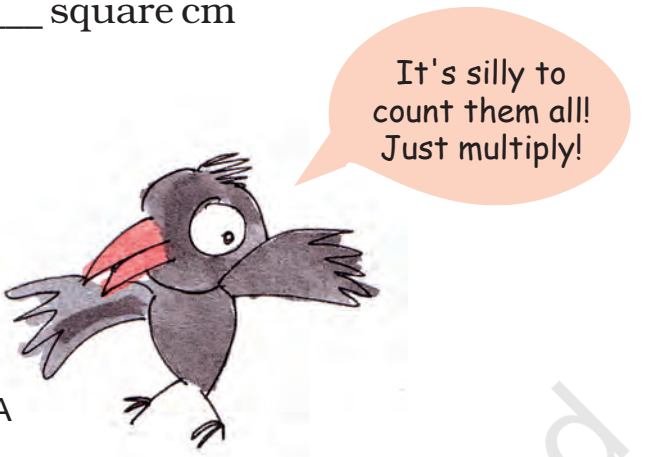
❊ Altogether how many squares can be arranged on it? _____

❊ So the area of piece A = _____ square cm



Piece A



❊ In the same way find the area of piece B.

❊ Who had the bigger piece? How much bigger?

Cover with Stamps

This stamp has an area of 4 square cm. Guess how many such stamps will cover this big rectangle.

Encourage children to first discuss different strategies for comparing the area of things by using different tokens, stamps, etc. In Class IV they have compared irregular shapes by counting squares. In the case of rectangles they can measure the sides to see how many squares of 1 cm side will fit in the whole shape.

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Check your guess

a) Measure the yellow rectangle. It is _____ cm long.

b) How many stamps can be placed along its length? _____

c) How wide is the rectangle? _____ cm

d) How many stamps can be placed along its width? _____

e) How many stamps are needed to cover the rectangle? _____

f) How close was your earlier guess? Discuss.

g) What is the area of the rectangle? _____ square cm

h) What is the perimeter of the rectangle? _____ cm

Practice time

a) Arbaz plans to tile his kitchen floor with green square tiles. Each side of the tile is 10 cm. His kitchen is 220 cm in length and 180 cm wide. How many tiles will he need?

b) The fencing of a square garden is 20 m in length. How long is one side of the garden?

c) A thin wire 20 centimetres long is formed into a rectangle. If the width of this rectangle is 4 centimetres, what is its length?

This 'Guess and check' activity can be done in the class by making use of other things present. For example: how many postcards can be placed on the top of the mathematics book, how many charts will cover the classroom walls, etc? Children can be asked to check their guesses by tiling things wherever possible. Once they are able to make close guesses, this work can be further extended by asking them to guess the area in terms of square cm.

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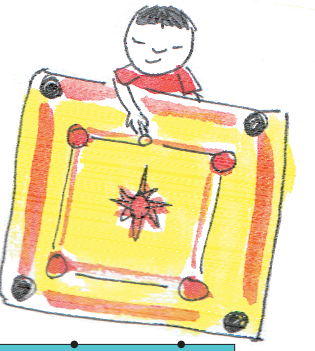
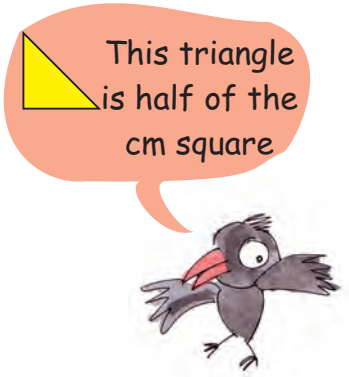
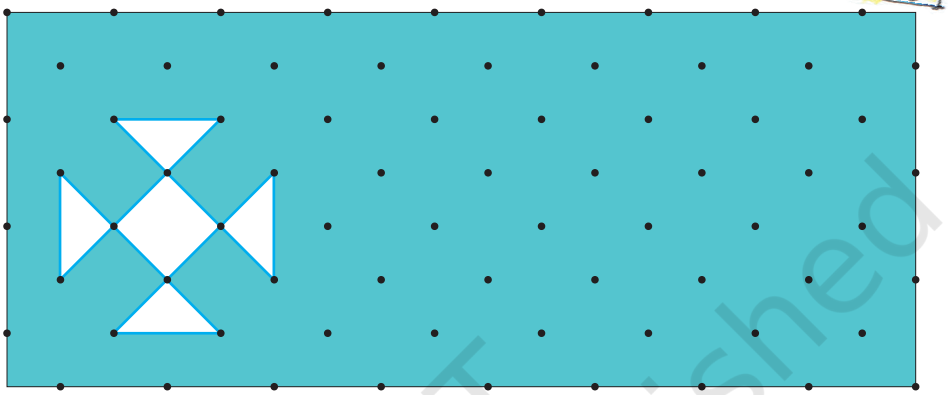
d) A square carrom board has a perimeter of 320 cm. How much is its area?



e) How many tiles like the triangle given here will fit in the white design?



Area of design = _____ square cm



❊ Make your own designs of area 4 and 6 square cm.

f) Sanya, Aarushi, Manav and Kabir made greeting cards. Complete the table for their cards:

Whose card	*Length*	*Width*	*Perimeter*	*Area*
Sanya	10 cm	8 cm		
Manav	11 cm		44 cm	
Aarushi		8cm		80 square cm
Kabir			40 cm	100 square cm

My Belt is Longest!

Take a thick paper sheet of length 14 cm and width 9 cm. You can also use an old postcard.

❊ What is its area? What is its perimeter?

❊ Now cut strips of equal sizes out of it.

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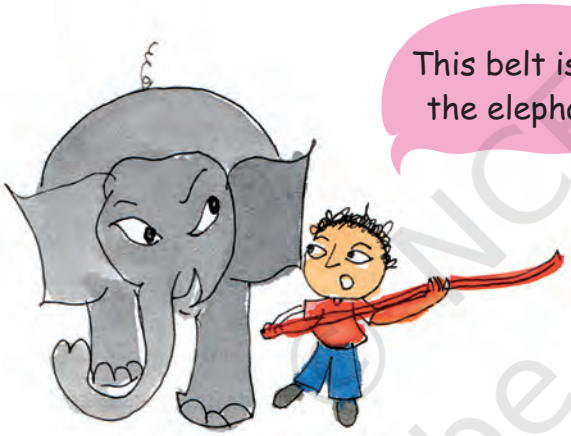
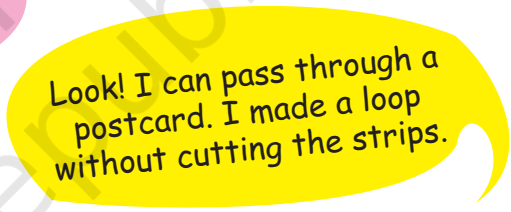
Using tape join the strips, end to end, to make a belt.

- How long is your belt?_____
- What is its perimeter _____
- Whose belt is the longest in the class? _____

Discuss

- Why did some of your friends get longer belts than others?
- Is the area of your belt the same as the area of the postcard? Why or why not?
- What will you do to get a longer belt next time?





Puzzle: Pass through a Postcard

Can you think of how to cut a postcard so that you can pass through it? (See photo.) If you have tried hard enough and still not got it... look for the answer somewhere ahead.

The aim of the belt activity is to understand that things with the same area can take different forms and also have very different perimeters. While measuring sides, lengths in mm can be rounded off for this activity.

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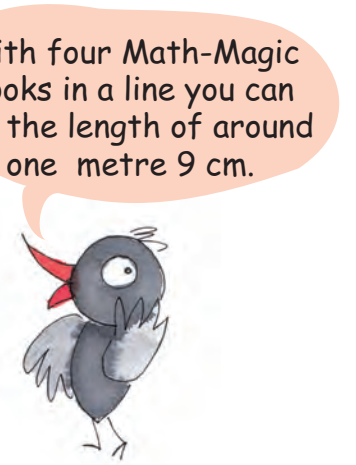
People People Everywhere



A) You can play this game in a ground.

Make two squares of one square metre each.

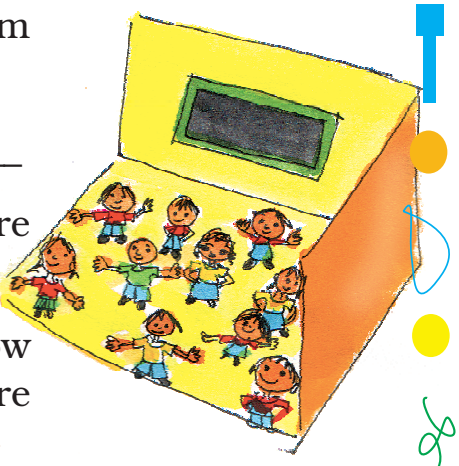
Divide your class in two teams. Ready to play!

Try these in your teams —

- How many of you can sit in one square metre? _____
- How many of you can stand in it? _____
- Which team could make more children stand in their square? How many? _____
- Which team could make more children sit in their square? How many?

B) Measure the length of the floor of your classroom in metres. Also measure the width.

- What is the area of the floor of your classroom in square metres? _____
- How many children are there in your class? _____
- So how many children can sit in one square metre? _____
- If you want to move around easily then how many children do you think should be there in one square metre? _____



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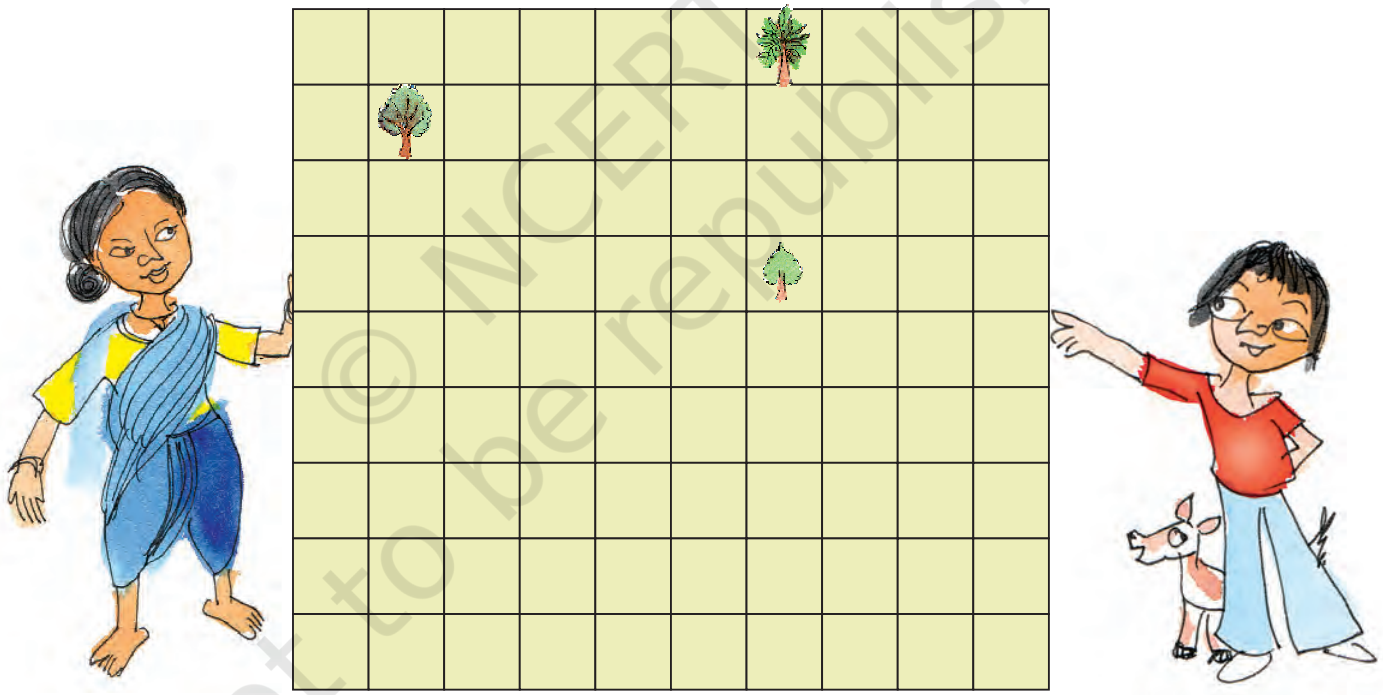
Can you imagine how big a square of side 1 km is! It has an area of _____ square km. Guess how many people can live on that.

In West Bengal there are about 900 people living in a square km.

But in Arunachal Pradesh it feels very lonely! There are less than 15 people living in a square km!

Share the Land

Nasreena is a farmer who wants to divide her land equally among her three children — Chumki, Jhumri and Imran. She wants to divide the land so that each piece of land has one tree. Her land looks like this.



* Can you divide the land equally? Show how you will divide it. Remember each person has to get a tree. Colour each person's piece of land differently.

Children are not expected to do conversion of sq m into sq km or vice-versa. The aim of exercise B is to develop a sense of how big or small the units of sq m and sq km are.

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❊ If each square on this page is equal to 1 square metre of land, how much land will each of her children get? _____ square m

Chumki, Jhumri and Imran need wire to make a fence.

❊ Who will need the longest wire for fencing? _____

❊ How much wire in all will the three need? _____

Practice time

A. Look at the table. If you were to write the area of each of these which column would you choose? Make a (✔).

	Square cm	*Square metre*	*Square km*
Handkerchief	✔		
Sari			
Page of your book			
School land			
Total land of a city			
Door of your classroom			
Chair seat			
Blackboard			
Indian flag			
Land over which a river flows			

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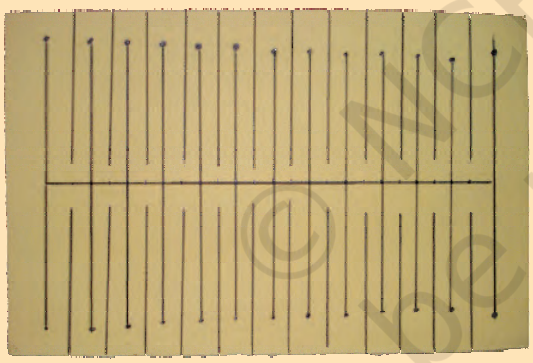
B. Draw a square of 9 square cm. Write A on it.

Draw another square with double the side. Write B on it.

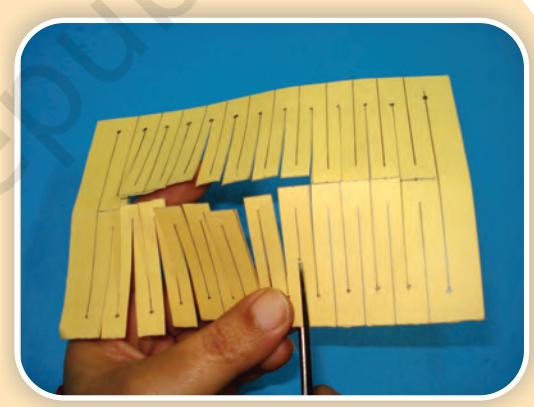
Answer these —

1. The perimeter of square A is _____ cm.
2. The side of square B is _____ cm.
3. The area of square B is _____ square cm.
4. The area of square B is _____ times the area of square A.
5. The perimeter of square B is _____ cm.
6. The perimeter of square B is _____ times the perimeter of square A.

Answer — Pass Through a Postcard (page 152)

1. 

Make lines on a postcard like this.

2. 

Cut the postcard only on the lines.

3.

So, can you pass through it!

* You know the area of the loop, don't you? It is _____.

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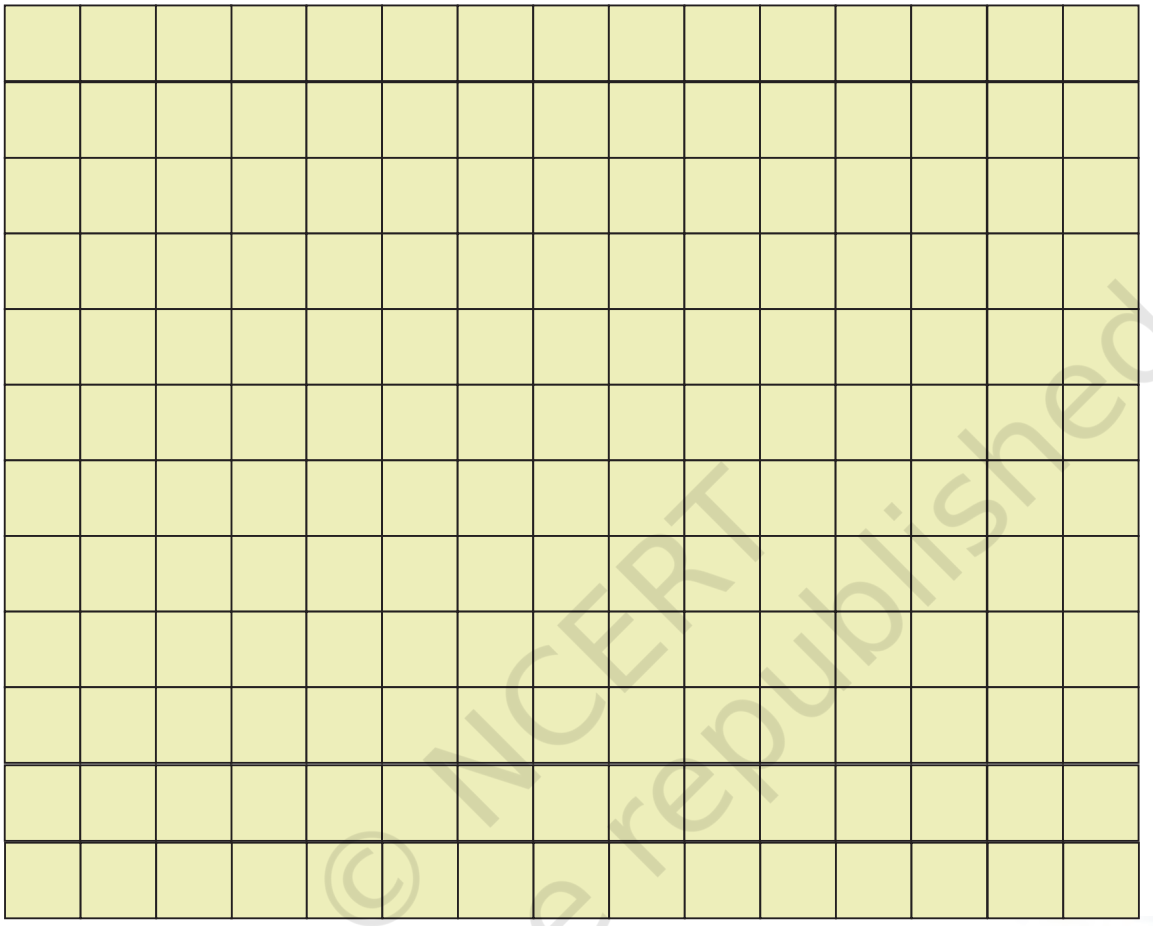
Thread Play

Take a 15 cm long thread. Make different shapes by joining its ends on this sheet.



A) Which shape has the biggest area? How much? _____

What is the perimeter of this shape? _____

B) Which shape has the smallest area? How much? _____

What is the perimeter of this shape? _____

Also make a triangle, a square, a rectangle and a circle. Find which shape has biggest area and which has the smallest.

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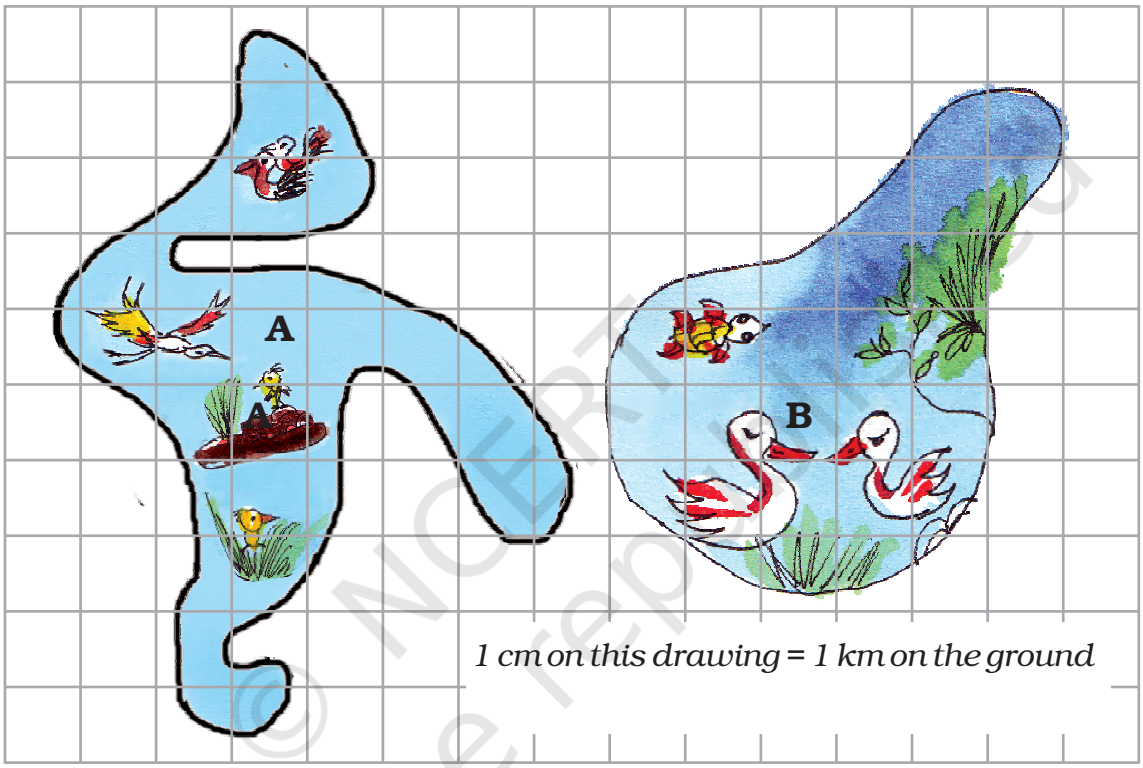
Save the Birds

There are two beautiful lakes near a village. People come for boating and picnics in both the lakes. The village Panchayat is worried that with the noise of the boats the birds will stop coming. The Panchayat wants motor boats in only one lake. The other lake will be saved for the birds to make their nests.



a) How many cm is the length of the boundary of lake A in the drawing? _____ (use thread to find out)

b) What is the length of the boundary of lake B in the drawing?

c) How many kilometres long is the actual boundary of lake A ?

d) How many kilometres long is the actual boundary of lake B?

e) A longer boundary around the lake will help more birds to lay their eggs. So which lake should be kept for birds? Which lake should be used for boats?

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f) Find the area of lake B on the drawing in square cm. What is its actual area in square km?

King's Story

The King was very happy with carpenters Cheggu and Anar. They had made a very big and beautiful bed for him. So as gifts the king wanted to give some land to Cheggu, and some gold to Anar.

Cheggu was happy. He took 100 metres of wire and tried to make different rectangles.

He made a 10 m × 40 m rectangle. Its area was 400 square metres.

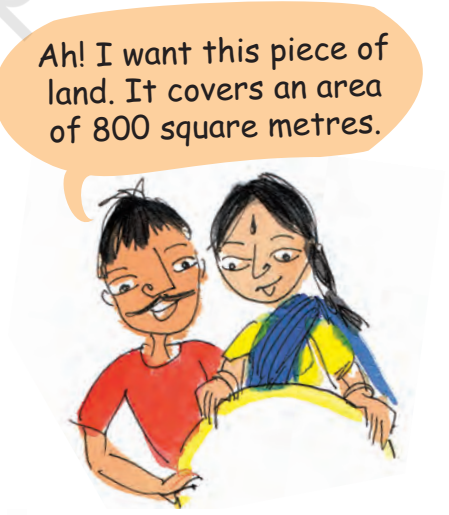
So he next made a 30 m × 20 m rectangle.

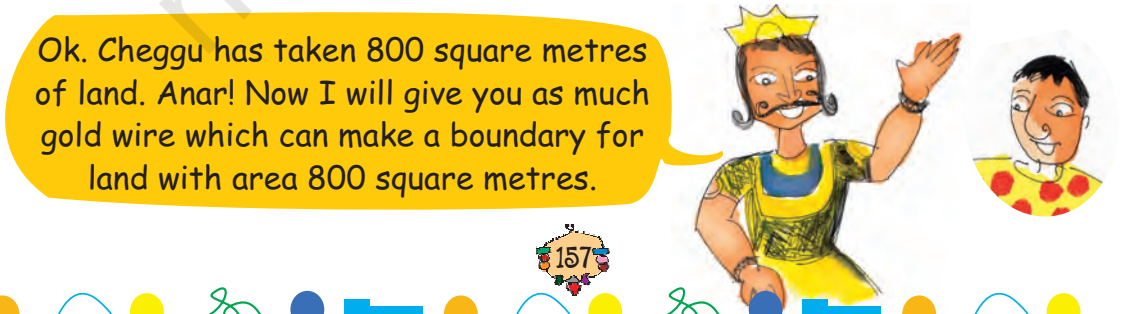
❊ What is its area? Is it more than the first rectangle?

❊ What other rectangles can he make with 100 metres of wire? Discuss which of these rectangles will have the biggest area.

Cheggu's wife asked him to make a circle with the wire. She knew it had an area of 800 square metres.

❊ Why did Cheggu not choose a rectangle? Explain.





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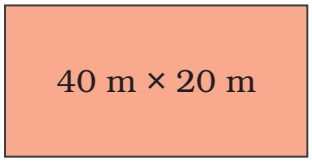
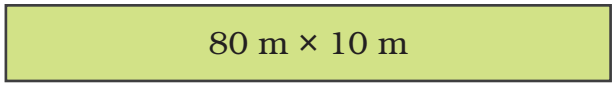
So Anar also tried many different ways to make a boundary for 800 square metres of land.

❊ He made rectangles A, B and C of different sizes. Find out the length of the boundary of each. How much gold wire will he get for these rectangles?

A 

Gold wire for A = _____ metres

B 

Gold wire for B = _____ metres

C

Gold wire for C = _____ metres

But then Anar made an even longer rectangle.... See how long!

D

8000 m × 0.1 m

So he will get _____ metres of gold wire!!

Now do you understand why the king fainted!!!

Can you make a rectangle with a still longer boundary? I made a rectangle 1 cm wide and 80000 m long. Imagine how long that boundary will be!!! With that much gold wire I can become the king!

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12 Smart Charts

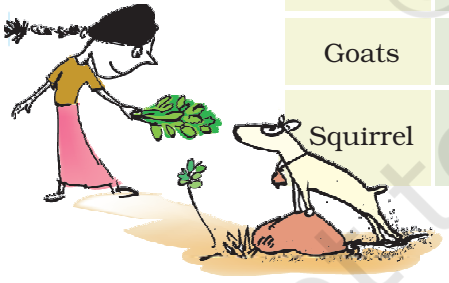
0527CH12

Chi-Chi, Meow-Meow

Yamini did a project 'Animals and Birds'. She asked each child of her class about one favourite pet animal.

She used **tally marks** to record each answer. For example if someone said 'cat' she put one line | in front of 'cats'. When someone said 'cat' again, she added a line. So ⌐ means two cats and ▨ means 5 cats. In all 24 children said 'cat' was their favourite animal. Help Yamini complete the table.

Animal	*Tally Marks*	*Number*
Cats	▨ ▨ ▨ ▨ ⌐	24
Dogs	▨ ▨ ▨ ▨ ▨ ▨ ⌐	
Rabbits	▨ ▨	
Cows	▨ ▨ ▨ ▨ |	
Parrots	▨ ⌐	
Goats	▨ ▨ ▨ ▨	
Squirrel	▨ ▨ ▨	



- Look at the tally marks and write the number for each animal in the table. How many children in all did Yamini talk to?
- Which is the most favourite pet animal in this table?
- Which pet will you like to have? What will you name it? Which other animals can be kept at home? Discuss.

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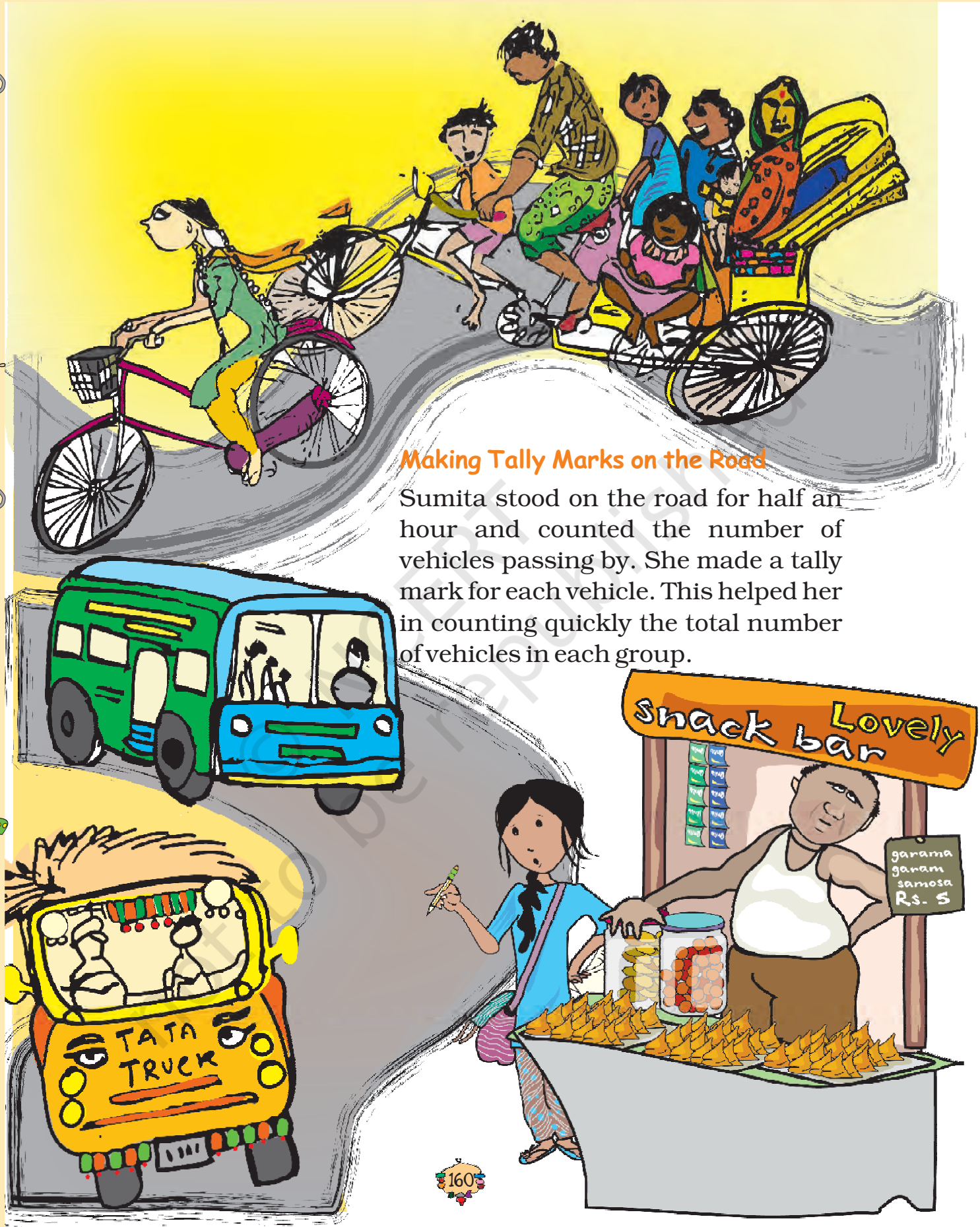

Making Tally Marks on the Road

Sumita stood on the road for half an hour and counted the number of vehicles passing by. She made a tally mark for each vehicle. This helped her in counting quickly the total number of vehicles in each group.

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	Tally Marks	Number
Cycle	𝍸 𝍸 𝍸 𝍸 𝍸 |	
Car	𝍸 𝍸 ⌜	
Auto rickshaw	𝍸 𝍸 𝍸 ⌜	
Bus	𝍸 𝍸 𝍸	
Cycle rickshaw	𝍸 𝍸 𝍸 𝍸 □	
Truck	𝍸 |	

- Write the number of each vehicle in the table.
- How many vehicles in all did Sumita see on the road in half an hour?
- Auto rickshaws are thrice the number of trucks — true/false?
- Make tally marks for 7 more buses, and 2 more trucks.

Try yourself

- Take a round in your colony. Find out how many types of trees you can see there. Do you know their names? You can make drawings. Use tally marks to note the number of different trees.

Children should be encouraged to use tally marks to simultaneously record data of a variety of things with larger numbers.

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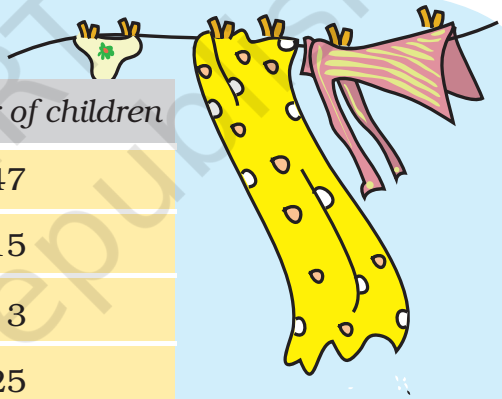
Helping Hands

In the EVS period, the teacher asked children whether they help their parents at home. There were different answers. Children named the work in which they help their parents the most. The teacher collected their answers and made a table.

Help most in house work	*Number of children*
Going to the market	47
Washing utensils	15
Washing clothes	3
Making, serving food	25
Cleaning the house	10
Total children who said they help their parents	



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Now you can fill the chapati chart to show the numbers given in the table.

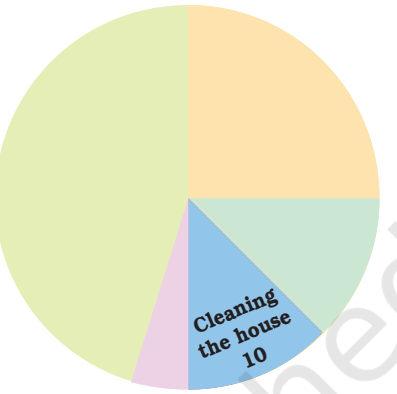
1) Look and find out

Children who help in making or serving food are

a) One-third of the total children

b) Half of the total children

c) One-fourth of the total children



2) Practice time: After school

Ask 10 of your friends about what they like to do most after school.

What they like to do after school	*Number of children*
Watching TV	
Playing football	
Reading story books	

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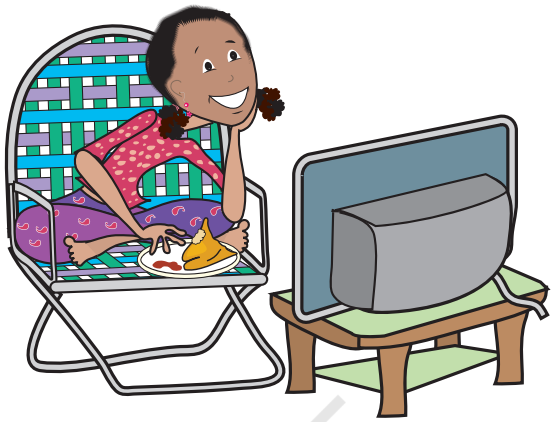
Ad Mad!!

Ragini loves to watch cartoons on television. One day she thought of counting the number of ads during the breaks. She found that in each break there were 14 advertisements. In 10 of those ads there were children as actors.

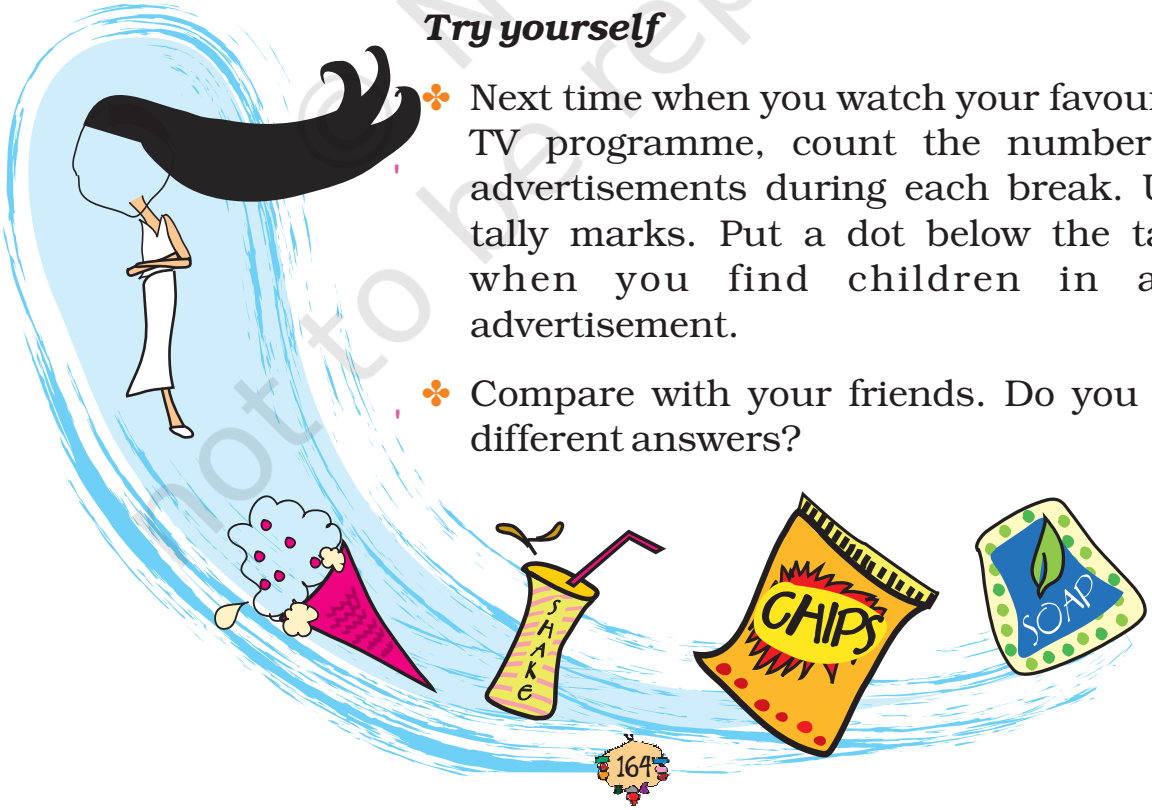


- Why do you think that children are used in so many ads?
- Use tally marks to count the number of ads during a short break in a programme.

Were there ads during the news programme?

Try yourself

- Next time when you watch your favourite TV programme, count the number of advertisements during each break. Use tally marks. Put a dot below the tally when you find children in any advertisement.
- Compare with your friends. Do you get different answers?



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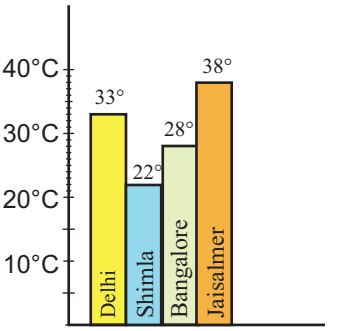
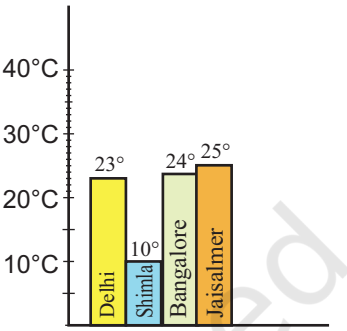
Hot and Cold

Have you seen the weather report on TV or in a newspaper? These are two bar charts. These show the highest temperature (in degrees Celsius) in four cities, on two different days. The cities are Delhi, Shimla, Bangalore and Jaisalmer.



1 June



1 December

Find out from the bar chart —

- Which city is the hottest on 1 June?
- Which city is the coldest on 1 December?
- Which city shows little change in temperature on the two days — 1 June and 1 December.

Try yourself

On any one day, choose any three cities and record their temperature from the TV or newspaper.

- Make a bar chart in your notebook and ask your friends a few questions about it. See if they understand your chart!

Encourage children to look at the map of India to locate different cities. They can try to relate the temperature variations in a city to get an idea of the climate there.

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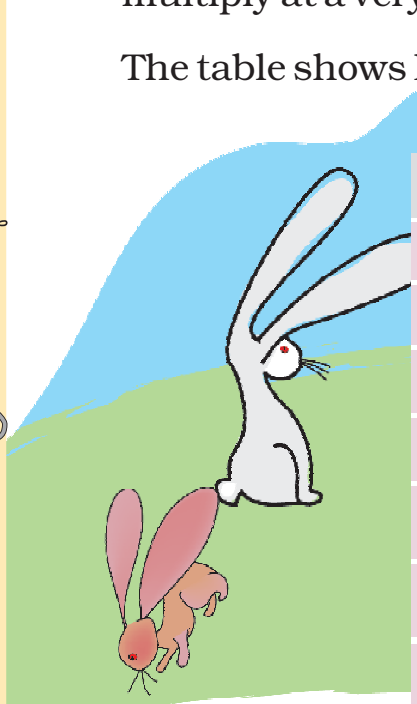
Rabbits in Australia

Earlier there were no rabbits in Australia. Rabbits were brought to Australia around the year 1780. At that time there were no animals in Australia which ate rabbits. So the rabbits began to multiply at a very fast rate. Imagine what they did to the crops!

The table shows how rabbits grew every year.



Time	*Number of rabbits*
Start	10
1 year	18
2 year	32
3 year	58
4 year	108
5 year	
6 year	

1) After each year the number of rabbits was —

   a) a little less than double the number of rabbits in the last year.

   b) double the number in the last year.

   c) 8 more than the number in the last year.

   d) more than double the number of rabbits in the last year.

2) At the end of year 6, the number of rabbits was close to

   ☐ 400 ☐ 600 ☐ 800

3) After which year did the number of rabbits cross 1000?

More such examples should be done in class. It is important for children to get a sense of approximation.

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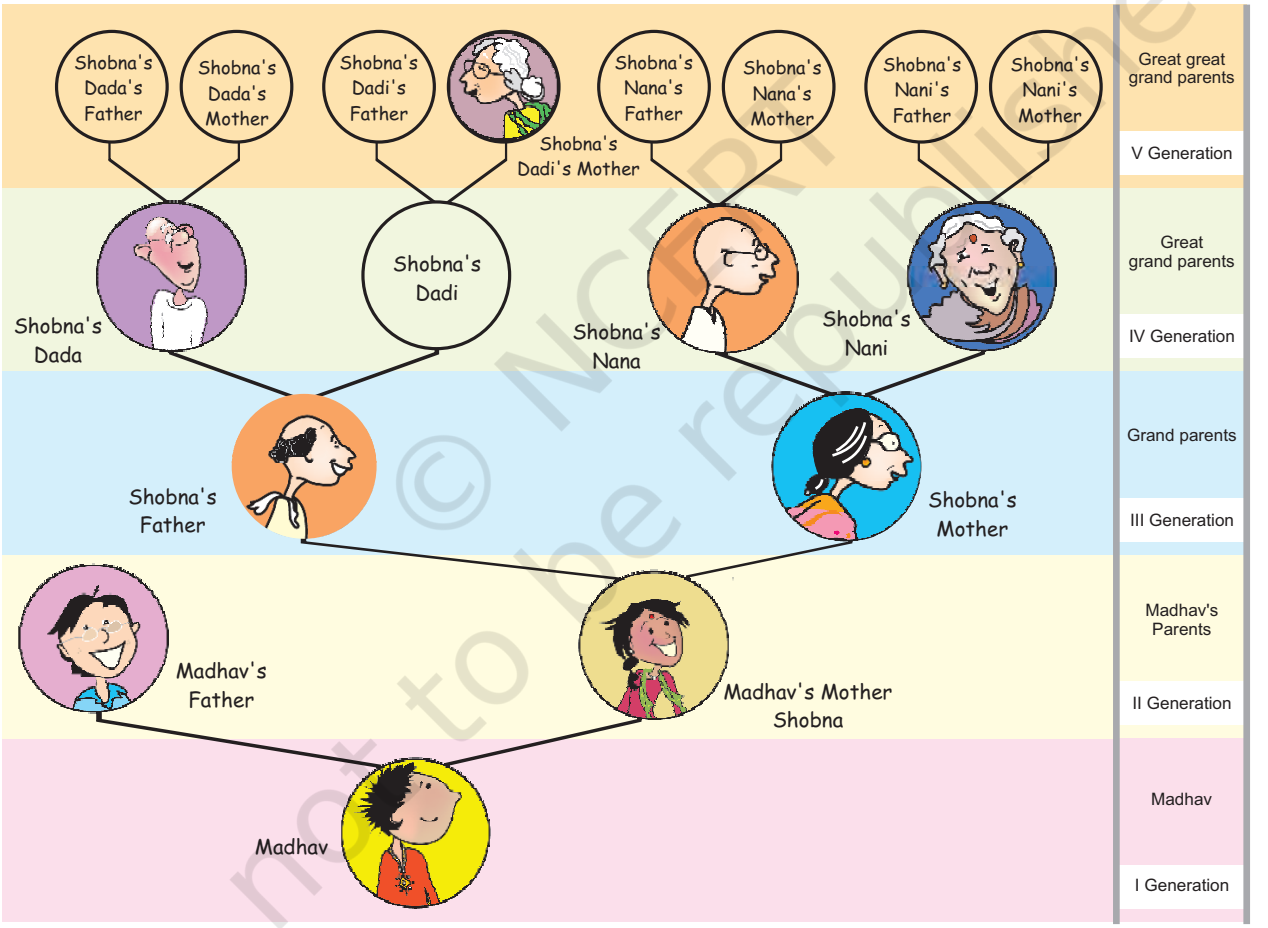
Family Tree

Madhav went to a wedding along with his parents. He met many relatives there. But he didn't know everyone. He met his mother's grandfather, but found that her grandmother is not alive. He also found that her *Dadi's* mother (grandmother's mother) is still alive, and is more than a hundred years old.

Madhav got confused. He couldn't imagine his mother's grandmother's mother! So, Madhav's mother made a family tree for him —



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Madhav's mother helped him understand her family with the help of this drawing. You can also find out about your older generations using such a family tree.

Answer these questions:

1) How many grand parents in all does Shobna have?

2) How many great, great grand parents in all does Madhav have?

3) How many elders will be in the VII generation of his family?

4) If he takes his family tree forward in which generation will he find 128 elders?

Growth Chart of a Plant

Amit sowed a few seeds of *moong dal* in the ground. The height of the plant grew to 1.4 cm in the first four days. After that it started growing faster.

Amit measured the height of the plant after every four days and put a dot on the chart. For example if you look at the dot marked on the fourth day, you can see on the left side scale that it is 1.4 cm high.

Now look at the height of each dot in cm and check from the table if he has marked the dots correctly.

Day	*Length of the plant (in cm)*
0	0
4	1.4
8	5.3
12	9.5
16	10.2
20	10.9

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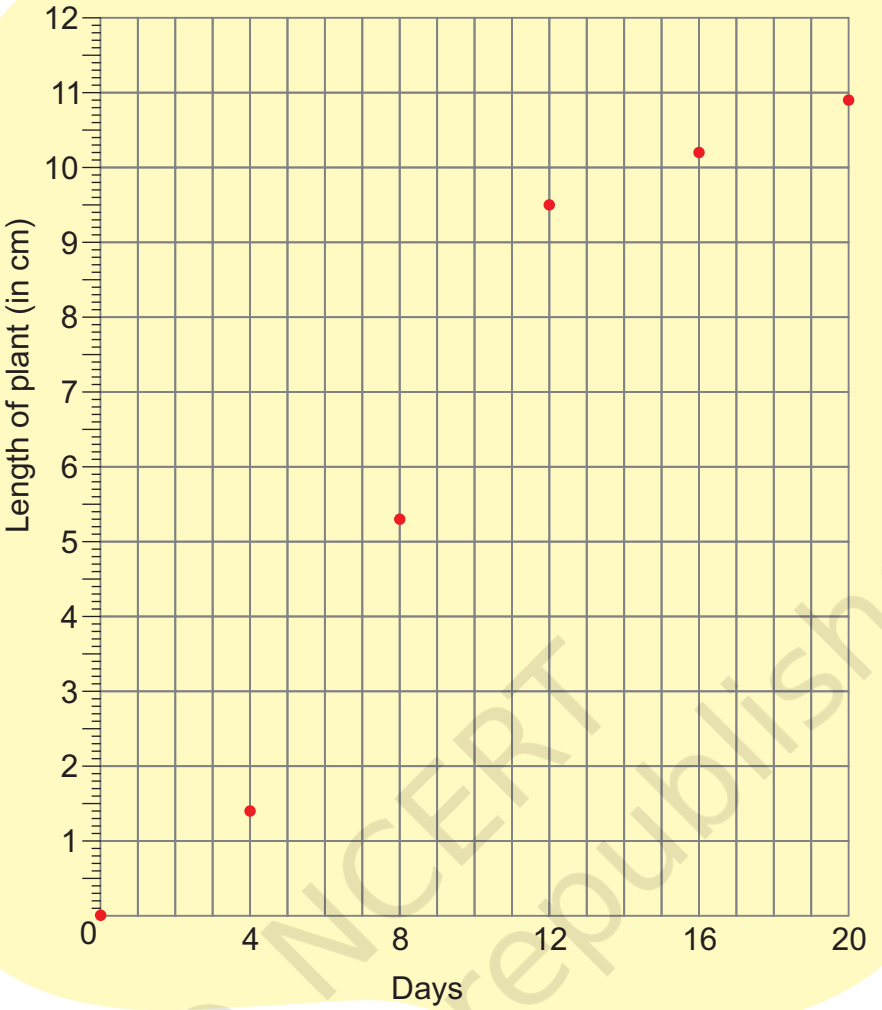

Find out from the growth chart

a) Between which days did the length of the plant change the most?

i) 0-4 ii) 4-8 iii) 8-12 iv) 12-16 v) 16-20

b) What could be the length of this plant on the 14th day? Guess.

i) 8.7 cm ii) 9.9 cm iii) 10.2 cm iv) 10.5 cm

c) Will the plant keep growing all the time? What will be its length on the 100th day? Make a guess!

There should be some discussion on the last question. Children should be encouraged to observe growth patterns of many other plants and animals.

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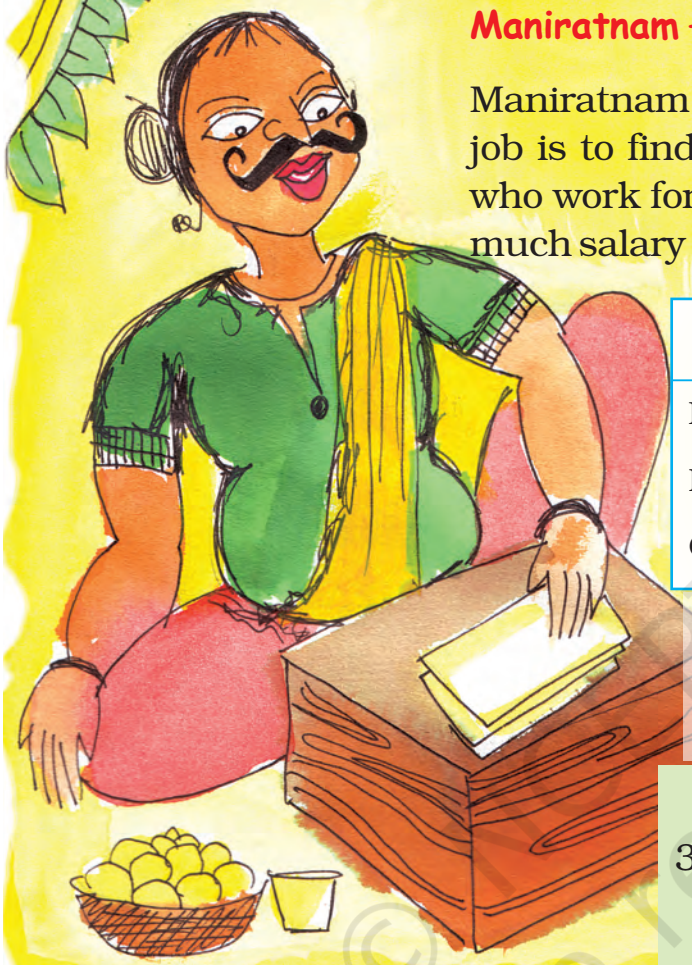
13 Ways to Multiply and Divide

0527CH13

Maniratnam – The Cashier



Maniratnam is the cashier of king Jayan. His job is to find out the salary of all the people who work for the king. This chart shows how much salary each person gets in a day.

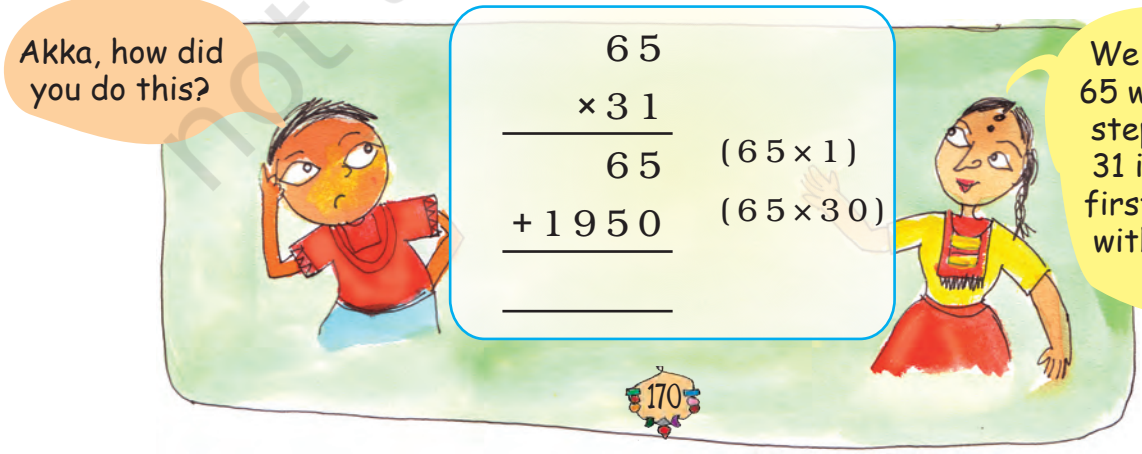
Person	*Salary in a day*
Minister	₹ 195
Horse rider	₹ 76
Cook	₹ 65

Maniratnam wanted to calculate the salary of the cook for the month of January. He wrote —

	60	5
30	60 × 30 **1800**	5 × 30 **150**
1	60 × 1 **60**	5 × 1 **5**

Rupees 1800 + 150 + 60 + 5 = ₹ _____

Maniratnam's daughter Bela has learnt another method to multiply. She wrote like this and showed it to Bhanu, her brother.



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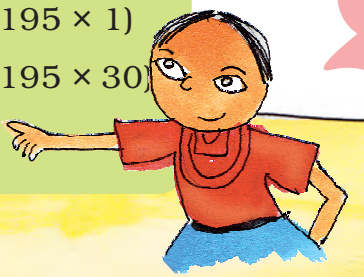
Now Bhanu tried to find the salary of a minister for the month of January. He wanted to multiply 195 × 31.

$$\begin{array}{r} 195 \\ \times\ 31 \\ \hline 195 \\ +\ \_\_\_0 \\ \hline \end{array} \quad \begin{array}{l} \\ \\ (195 \times 1) \\ (195 \times 30) \\ \\ \end{array}$$



To multiply by 30 I first write a zero here. Then I only have to multiply by 3.

Practice time

1) Use Bela's method to multiply these numbers.

a) 32 × 46

b) 67 × 18

$$\begin{array}{r} 32 \\ \times\ 46 \\ \hline 192 \\ +\ \_\_\_\_ \\ \hline \end{array} \quad \begin{array}{l} \\ \\ (32 \times 6) \\ (32 \times 40) \\ \\ \end{array}$$

$$\begin{array}{r} 67 \\ \times\ 18 \\ \hline \_\_\_ \\ +\ 670 \\ \hline \end{array} \quad \begin{array}{l} \\ (67 \times 8) \\ (67 \times \_\_) \\ \\ \end{array}$$

2) Do these in your notebook using Bela's method.

a) 47 × 19

b) 188 × 91

c) 63 × 57

d) 225 × 22

e) 360 × 12

f) 163 × 42

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Shantaram a Special Cook

- Shantaram is a special cook who comes only on party days. Last year he was called for only 28 days. For each day he has to be paid ₹ 165. Find out how much money he will get in all.
- If he is called for all days of the year, how much salary will he get?

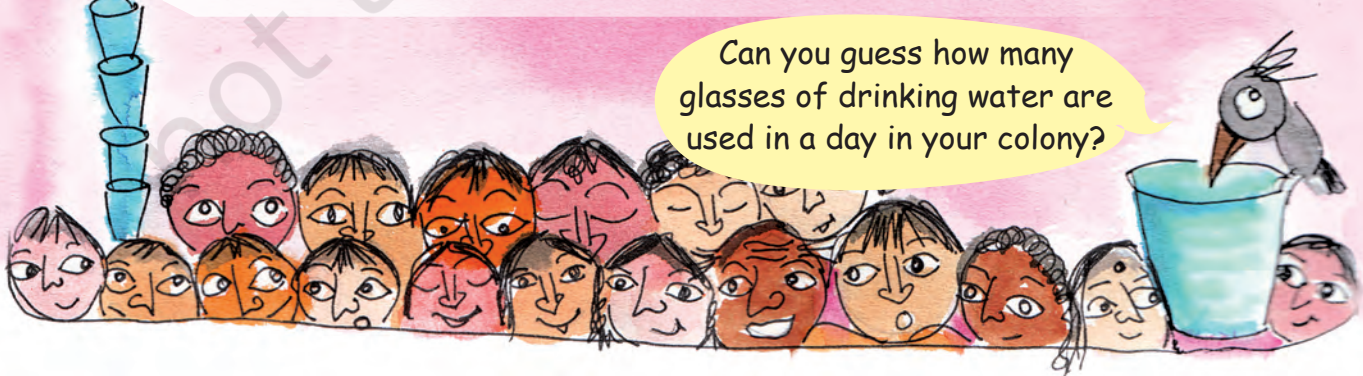
```
    1 6 5
  × 3 6 5
  ---------
      - - -   (165×5)
    - - - -   (165×60)
+ 4 9 5 0 0   (165×300)
  ---------
  ---------
```

- Now find the salaries of the minister and horse rider for 1 year.

Years and Years

a) Sohan drinks 8 glasses of water every day.

- How many glasses will he drink in one month? _____
- How many glasses will he drink in one year?
- If 125 people living in a colony drink 8 glasses of water in a day, how much water will they drink in a year?



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b) If Soha's heart beats 72 times in one minute, how many times does it beat in one hour?

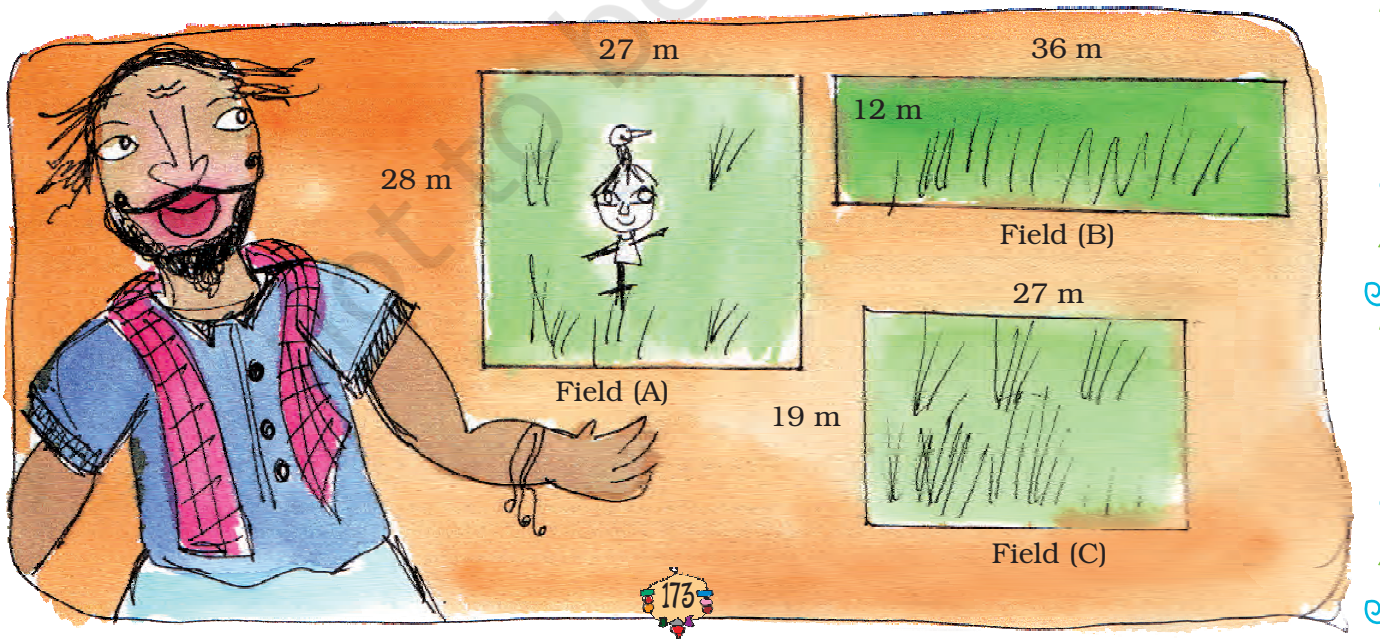
- Now find out how many times it beats in one day.
- Count your own heart beats to find out how many times your heart beats in one week.

c) A baby elephant drinks around 12 L of milk every day. How much milk will it drink in two years?

d) A baby blue whale drinks around 200 L of milk in one day. Just imagine how much milk that is! Find out in how many days your family would use 200 L milk. How much milk would the baby blue whale drink in eight months?

Karunya — The Landlord

Karunya bought three fields.



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❊ Find the area of all the three fields.

Field (A) _____ square metre.

Field (B) _____ square metre.

Field (C) _____ square metre.

He bought field (A) at the rate of ₹ 95 for a square metre, field (B) at ₹ 110 for a square metre and field (C) at ₹ 120 for a square metre.

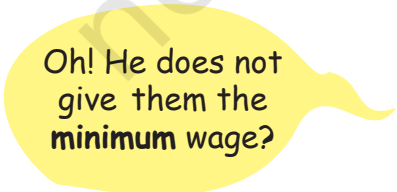
❊ Find the cost of all three fields.

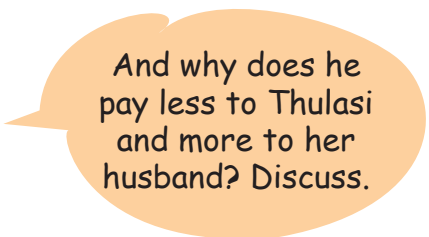
Thulasi and her husband work on Karunya's farm. The Government has said that farm workers should be paid at least ₹ 71 for one day's work. But he pays ₹ 55 to Thulasi and ₹ 58 to her husband.

If Thulasi works for 49 days, how much money does she get? ____

If her husband works for 42 days, how much money does he get? _____

Find the money they earn together _____





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I saw this in the newspaper. Governments of different states have said that farmworkers should not be paid less than this salary for a day's work.

State	*Salary for one day*
Haryana	₹ 135
Rajasthan	₹ 73
Madhya Pradesh	₹ 97
Orissa	₹ 75

The table shows the amounts fixed by four states.

a) For farm work which state has fixed the highest amount? Which state has fixed the lowest?

b) Bhairon Singh is a worker in Rajasthan. If he works for 8 weeks on the farm, how much will he earn?

c) Neelam is a worker in Haryana. If she works for 2½ months on the farm, how much will she earn?

d) How much more will a farm worker in Madhya Pradesh get than a worker in Orissa after working for 9 weeks?

Farmers in Vidarbha (Maharashtra)

Vidarbha is facing a very serious problem. There was no rain and crops failed. Many farmers were unhappy. Some farmers even ended their own lives. A newspaper reporter went around the area and spoke to the people. He wrote these two reports.

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Satish's story

Satish is a 13 year old boy. His father had taken a loan for farming. But the crops failed. Now Satish's mother has to pay ₹ 5000 every month for the loan.

Satish started working — he looked after 17 goats of the village.

He earns ₹ 1 everyday for one goat.

- How much will he earn in one month?
- Does he earn enough to help pay the loan every month?
- How much will he earn in one year?

Kamla Bai's story

To help farmers the State Government gave cows. Kamla Bai Gudhe also got a cow. The cost of the cow was ₹ 17,500. She had to pay ₹ 5,500 and the government spent the rest of the money.

- How much did the government spend on the cow?

- If 9 people from her village got cows, how much did the government spend in all?

But Kamla Bai was not happy. She had to spend ₹ 85 everyday on the cow. She made some money by selling the milk. But still she wanted to sell the cow.

- If Kamla Bai spends ₹ 85 a day, find out how much she will spend in one month.
- The cow gives 8 litre of milk everyday. How much will it give in one month?

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Find out — how much do you pay for 1 litre of milk?

* If the milk is sold at ₹ 9 per litre, how much money will Kamla Bai make in one month?

  _____

So the money spent on keeping the cow was ₹ _____

Money earned by selling the milk ₹ _____

Which is more — money spent on the cow or money earned from it? How much?

* Explain why she wanted to sell the cow.

Practice time

a) Sukhi works on a farm. He is paid ₹ 98 for one day. If he works for 52 days, how much will he earn?

b) Hariya took a loan to build his house. He has to pay back ₹ 2,750 every month for two years. How much will he pay back in 2 years?

c) Ratiram is a milk seller in the city. He sells 13 litres of milk everyday at ₹ 23 per litre. How much does he earn?

d) A farmer sells 1 litre of milk for ₹ 11. In one month he sells 210 litres of milk. How much does he earn in a month?

e) A company sells 1 litre of packed water for ₹ 12. A shopkeeper buys 240 litres of packed water. How much does he pay?

Oh God! Water costs more than milk!! In the city people buy water for ₹ 12 per litre!

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Fun with multiplication

A) Look for the pattern and take this forward.

$(0 \times 9) + 1 = 1$

$(1 \times 9) + 2 = 11$

$(12 \times 9) + 3 = 111$

$(123 \times 9) + 4 =$ _____

$(1234 \times 9) + 5 =$ _____

$(12345 \times 9) + 6 =$ _____

B) Each letter **a, b, c** here stands for a number.

$$\begin{array}{r} aaa \\ \times aaa \\ \hline aaa \\ aaa0 \\ aaa00 \\ \hline abcba \end{array}$$

Take a = 1, then find what the numbers b and c will be.

C) Tricks with your age.

Write your age_____

Multiply it by 7 _____

Again multiply the answer by 13 _____

Multiply again that answer by 11 _____

Now look at your last answer. Can you find your age in that answer? How many times does your age show in the answer?

Now try this trick with other people.

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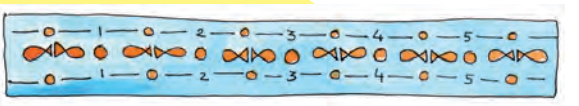
D) Going round and round!



142857 × 1	142857 × 2	142857 × 3	142857 × 4	142857 × 5

Do you find a pattern in all these answers? Discuss this with your friends.

Division

Dolma took a loan from a friend to buy a moped for ₹ 9,588. She has to pay it back in equal amounts every month for six months.

* How much will she have to pay every month? She asked her children to calculate.

Her daughter did it this way.

500 + 500 + 500 + 90 + 8

```
6 | 9588
  -3000
  ----
  6588
  -3000
  ----
  3588
  -3000
  ----
   588
  -540
  ----
    48
   -48
  ----
     ×
```

Her son started this way. Now you complete it.

```
1000 +
6 | 9588
  -6000
  ----
```

Will both of them get the same answer? Discuss.

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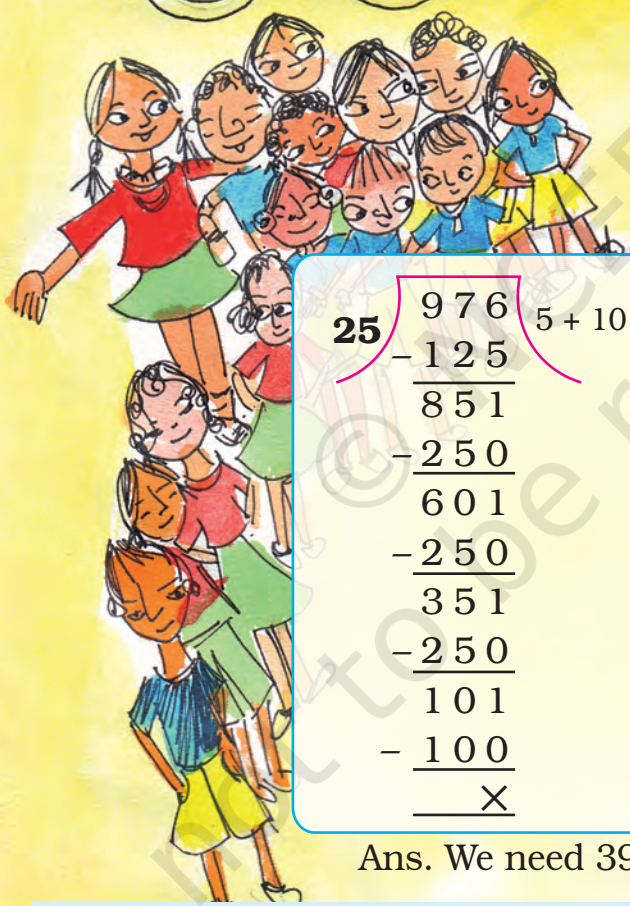
Practice time

Try to solve these using as few steps as you can.

a) $4228 \div 4$ b) $770 \div 22$ c) $9872 \div 8$

d) $672 \div 21$ e) $772 \div 7$ f) $639 \div 13$



How Many Times?

976 children are going on a picnic. They will be taken in mini buses. If 25 children can go in one bus, how many buses do they need?

❊ Two children have solved it. Check if they have made a mistake — correct it. Discuss.

25 | 976 — 5 + 10 + 10 + 10 + 4

−125
851
−250
601
−250
351
−250
101
− 100
×

Ans. We need 39 buses.

25 | 976 — 20 + 10 + 9 + 1

−500
476
−250
226
−215
11

Ans. We need 40 buses.

Giving children the opportunity to find and discuss the errors in these examples will help their own understanding about the different steps for division. In A) a very common error has been given in which children either forget or do not understand the remainder. In B) there is a simple error of multiplication but there is also a more interesting question of whether the child has shown one extra bus for one remaining child.

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How Much Petrol?

Isha has ₹ 1000 with her. She wants to buy petrol. One litre of petrol costs ₹ 47. How many litres can she buy?

Money with Isha = ₹ 1000

Cost of 1 litre = ₹ 47

Litres of petrol she can buy = ₹ 1000 ÷ ₹ 47 = ?

Isha can buy _____ litres of petrol.

Find out

If Isha comes to your city, how much petrol can she buy with the same money?

Children's Day

Children are happy today. They are celebrating Children's Day. Each child will be given 4 coloured pencils from school. The school has got 969 pencils. To find out how many children can get pencils the teacher asks them to divide.

Iru's Way

4) 9 6 9 (100 +
− 4 0 0
_____

Sreeni's Way

4) 9 6 9 (200 +
− _____

Complete Iru's and Sreeni's way of division. What is the answer you get?

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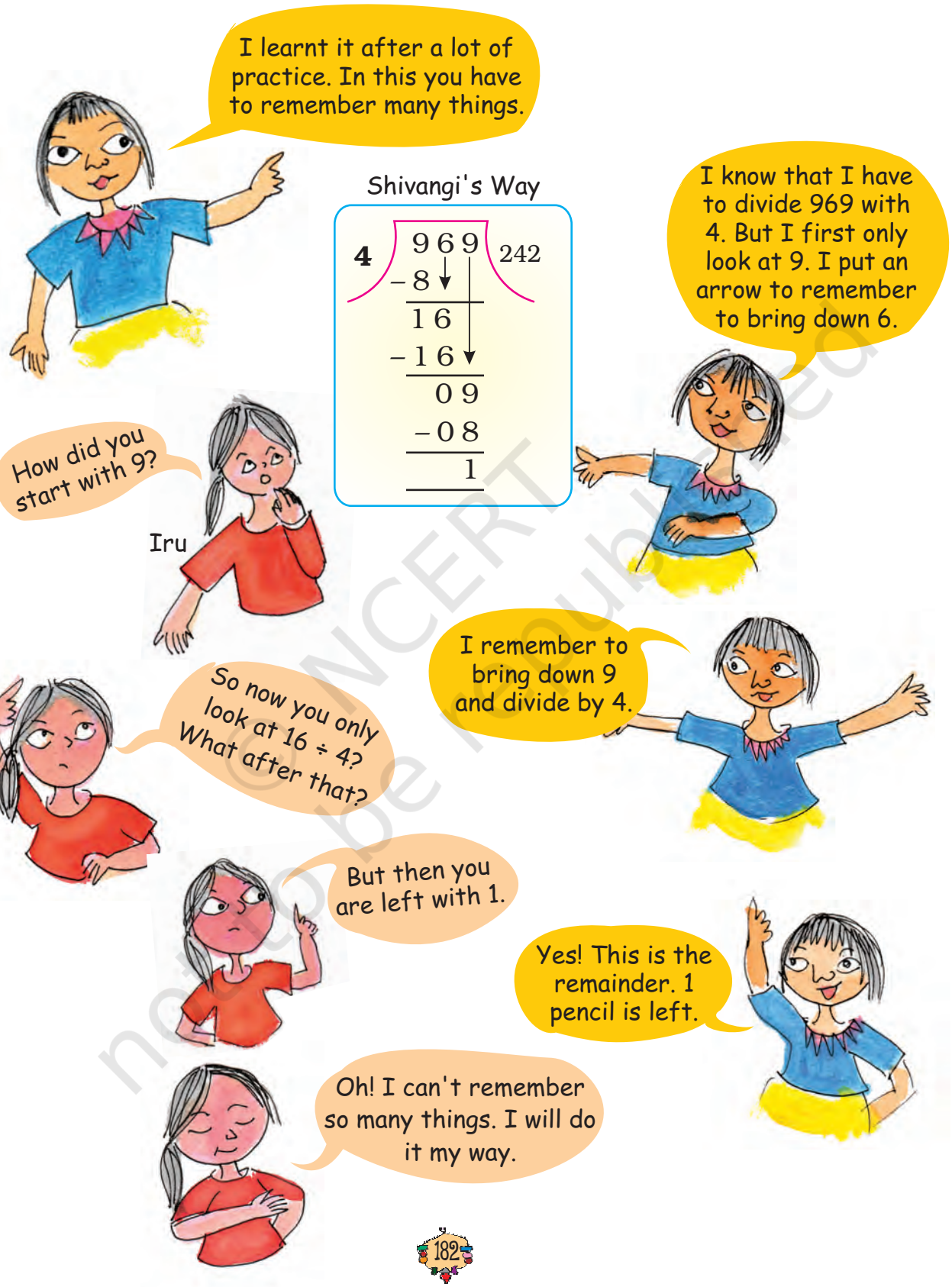
Shivangi did it by a shortcut way.



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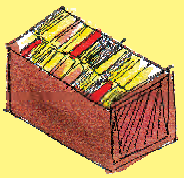
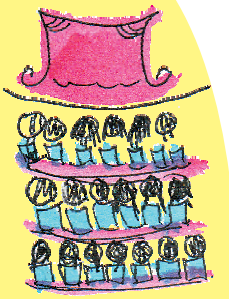
Practice Time



* 576 books are to be packed in boxes. If one box has 24 books, how many boxes are needed?



* 836 people are watching a movie in a hall. If the hall has 44 rows, how many people can sit in 1 row?

* A gardener bought 458 apple trees. He wants to plant 15 trees in each row. How many rows can he plant?

  How many trees would be left over?

Brain Teaser

* Shyamli bought a battery. She read on it 'Life: 2000 hours'. She uses it throughout the day and the night. How many days will the battery run?

More with Multiplication and Division

* A tank is full of 300 L of water. How much water will be filled in 25 tanks? If 15 buckets can be filled with one tank of water, how many buckets in all can be filled with the water in 25 tanks?

* There are 28 *laddoos* in 1 kg. How many *laddoos* will be there in 12 kg? If 16 *laddoos* can be packed in 1 box, how many boxes are needed to pack all these *laddoos*?

* There are 26 rooms in a school. Each room has 4 plants. If each plant needs 2 cups of water, how much water do we need for all the plants?

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Make the Best Story Problem

Each line gives a story. You have to choose the question which makes the best story problem. The first one is already marked.

1) A shopkeeper has 50 boxes. There are 48 fruits in one box.

Tick the one question which matches with the given problem.

a) How much will the shopkeeper pay in all? ☐

b) How many fruits are there in all? ✔

c) How many more boxes will he need? ☐

Explain why (a) and (c) are not good choices.

2) 352 children from a school went on a camping trip. Each tent had a group of 4 children.

a) How many children did each tent have? ☐

b) How many tents do they need? ☐

c) How many children in all are in the school? ☐

3) A shopkeeper has 204 eggs. He puts them in egg trays. Each tray has 12 eggs.

a) How many more eggs will he need? ☐

b) How many fresh eggs does he sell? ☐

c) How many egg trays does he need? ☐

Such exercises will help children understand the strategies to make questions related to the concepts of division and multiplication.

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4) *The cost of one book is ₹ 47. Sonu buys 23 books.*

a) How much money does she have?

b) How much money does she pay for the books?

c) What is the cost of 47 books?

Cross Check for Harisharan

Harisharan wanted to divide ₹ 2,456 amongst his 4 sons. He asked his eldest son to tell him how much money each one will get.

Papa, each of us will get 2456 ÷ 4 = ₹ 624.

When Harisharan started giving ₹ 624 to each son, he was left with less money for the youngest one.

It seems you have made some mistake in the calculations. Let me check.

Harisharan multiplied 624 with 4.

He got = ₹ 2,496.

Hum! This shows you have done the division wrong.

The son did the division again 2456 ÷ 4 = 614.

Before telling his father he checked on his own.

614 × 4 = 2456. Now, it is correct. Each one will get ₹ 614.

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Practice Time

1) Do these divisions. Check your results by multiplication.

a) 438 ÷ 9

b) 3480 ÷ 12

c) 450 ÷ 7

d) 900 ÷ 10

e) 678 ÷ 6

f) 2475 ÷ 11

2) Solve the given sums and colour the answers in the grid given below. See what you find.

21 × 16	15 × 7	93 × 2	17 × 5	10 × 10
26 × 26	77 × 10	50 × 10	11 × 11	59 × 7
85 × 30	64 × 42	3200 ÷ 40	19 × 3	248 ÷ 8
432 ÷ 18	729 ÷ 9	825 ÷ 5	221 ÷ 13	576 ÷ 12
288 ÷ 4	869 ÷ 11	847 ÷ 7	981 ÷ 3	475 ÷ 19

31 × 19

545	110	434	642	709	623	919	341	12	168
984	16	561	608	236	413	529	62	259	905
709	907	367	632	336	121	492	178	431	25
166	806	584	186	100	589	72	717	248	676
624	82	105	24	165	17	85	770	327	500
247	997	485	2688	81	80	48	901	126	121
742	427	756	531	79	2550	347	1001	314	57
945	1000	687	854	1200	31	124	3126	918	53
109	799	845	1999	864	955	123	1234	678	56
549	459	614	1864	834	559	900	1111	268	171

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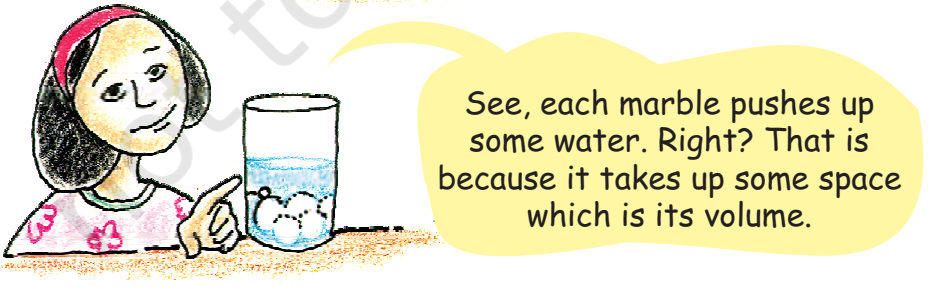
14 How Big? How Heavy?

0527CH14

Sarika collects things like marbles, coins, erasers etc. She takes some water in a glass and marks the level of water as '0'.

She drops 5 marbles in the glass. She marks the new level of water as 5 marbles.



Children will need more exercises to compare the volume of solid bodies by guessing and by informal measurement (using marbles, coins, matchboxes, etc.) before they begin to use formal measures such as litres and cubic centimetres.

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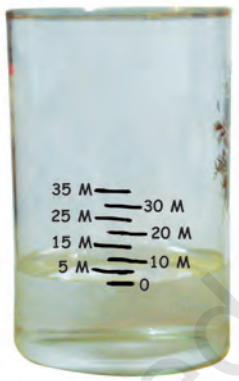
Your Measuring Glass

Now make a guess. Do you think the volume of 10 five-rupee coins will be more than that of 10 marbles?

Guess the volume of each of these:

- A ball is nearly _____ marbles.
- An eraser is nearly _____ marbles.
- A lemon is nearly _____ marbles.
- A pencil is nearly _____ marbles.
- A potato is nearly _____ marbles.



Now make your own measuring glass using 35 marbles.

Take a glass of water and mark the level of water as '0'. Then put in 5 marbles and mark the level of water as 5 M.

Again drop 5 marbles and mark the level of water as 10 M. Likewise make the markings for 15 M, 20 M, 25 M, 30 M and 35 M.

Now put each thing in the measuring glass and check your guess.

Try with different things like a matchbox, a stone, etc. and fill the table.

Name of the thing	*Its volume (nearly how many marbles?)*

Children can paste a paper strip on the glass and mark the level of water using a pen or a pencil. The aim is to develop a sense of the concept of volume through examples and hands on activities without giving a definition of volume. Comparing things on the basis of volume is more abstract then comparison in terms of length or area.

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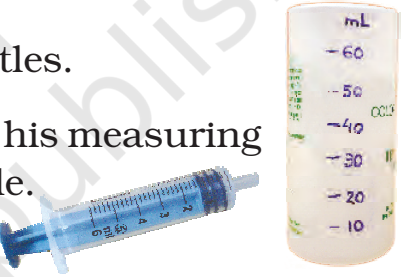
Which has More Volume?

In Class IV you made a measuring bottle for 250 mL.

Can you think of ways for making a measuring bottle which can measure 10 mL, 20 mL, 30 mL, ..., 60 mL? Discuss with your friend.

Tariq and Mollie made their measuring bottles.

Tariq had an injection. He used it to make his measuring bottle. Mollie used an empty medicine bottle.



Mollie used her measuring bottle to find the volume of five-rupee coins. She found that **9 five-rupee coins push up 10 mL of water**. So you can also use 9 five-rupee coins to make your measuring bottle! Go ahead!

Use your measuring bottle to find out:

a) What is the volume of 6 marbles? _____ mL.

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b) What is the volume of 16 one-rupee coins? _____ mL.

Now solve these in your mind.

c) The volume of 24 marbles is _____ mL.

d) The volume of 32 one-rupee coins? _____ mL.

e) Mollie puts some five-rupee coins in the measuring bottle. How many coins has she put in it:

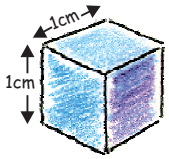
- if 30 mL water is pushed up? _____
- if 60 mL water is pushed up? _____

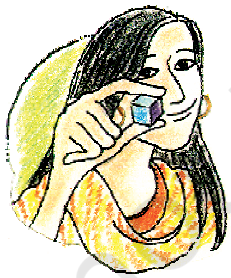
First guess and then use your measuring bottle to find out the volume in mL of some other things.

Thing	*Its volume (in mL)*

Guess how many litres of water your body will push up?!

How Many Can Fit In?





This is a cube whose sides are of 1 cm each. See, your Math-Magic book is 1 cm high. So guess how many such centimetre cubes will take the same space as your Math-Magic book?

To make a measuring bottle, make children use a wide-mouthed and transparent bottle so that markings can be made easily. The activity aims to develop measurement skills in children and involves both making and handling apparatus (such as measuring bottle) in the mathematics classroom.

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❊ Now if all these cubes are arranged in one line then how long will that line be?_____cm

Practice time

1. A stage (platform) is made with 5 Math-Magic books. The volume of this stage is the same as _____ cm cubes.

2. Guess the volume of these things in cm cubes.

❊ A matchbox is about _____ cm cubes.

❊ A geometry box is about_____cm cubes.

❊ An eraser is about_____cm cubes.

How will you check your guess? Discuss.

Matchbox Play

Tanu is making a stage with matchboxes.

She first puts 14 matchboxes like this in the first layer.

The activity 'How many can fit in' requires a sense of the size of a cm cube. For finding the volume of different shapes, the teacher can make cm cubes and use matchboxes to make different models. Tanu's stage or Mohan's model are examples where children calculate volume in terms of matchboxes, which may later be converted into cm cubes.

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She makes 4 such layers and her stage looks like this.

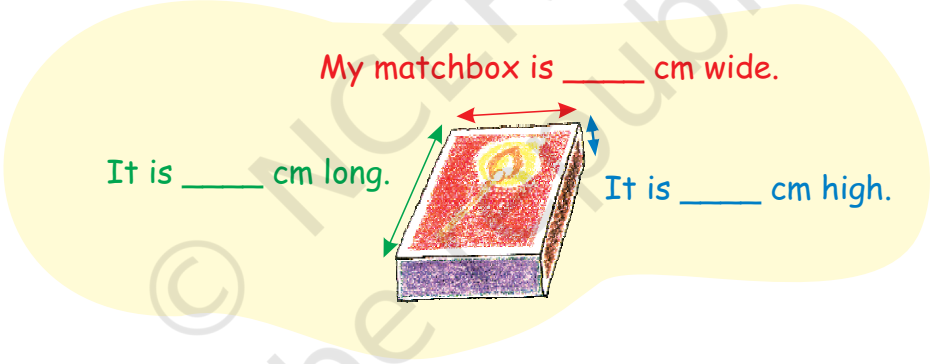
❊ She used _____ matchboxes to make this stage.

❊ The volume of one matchbox is the same as 10 cm cubes. Then the volume of this stage is same as _____ cm cubes.

❊ If all these cubes are arranged in a line, how long will that line be? _____ cm.

❊ Which has more volume — your Math-Magic book or Tanu's platform?

With your friends, collect many empty matchboxes of the same size. Measure the sides and write here.



❊ Use 56 matchboxes to make platforms of different heights. Fill this table.

	How high is it?	*How long is it?*	*How wide is it?*
Platform 1			
Platform 2			
Platform 3			

The volume of each platform is equal to _____matchboxes.

❊ Make deep drawings of the platforms you have made.

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Practice time

Mohan arranged his matchboxes like this.

- How many matchboxes did he use to make it? What is its volume in matchboxes? _____ matchboxes.
- Collect empty matchboxes. Arrange them in an interesting way. Make a deep drawing of it.

Making a Paper Cube

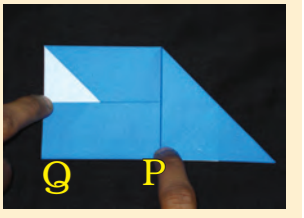
Aanan and his friends are making a cube with paper. They cut a sheet of paper into a square of **19.5 cm** side. They cut 6 such squares. Follow these photos to make your paper cube.

1. Fold the paper into four equal parts to make lines like this.

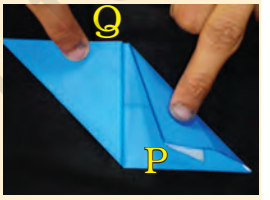
2. Fold the top **left** corner and the corner opposite to it like this.

3. Fold the top and the bottom edges to meet the centre line. Now fold corner P...

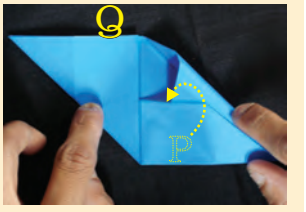
4. So that the paper looks like this.



5. Fold corner Q in the same way. The paper will look like this now.



6. Lift corner P and slip it under the folded paper like this.



Encourage children to make different shapes of the same volume using identical units, for example, bricks or matchboxes. To calculate the sides of the platform, lengths can be rounded off to the nearest centimetre.

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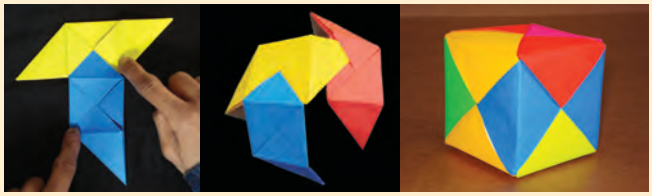
7. Do the same for corner Q. The paper will look like this.

8. Turn the paper and fold it to make lines like these.

9. Each child should make one such piece. Six children will take their pieces and put one inside another to make this paper cube.



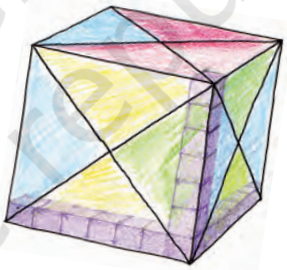
Note: Remember to begin with a square paper of side 19.5 cm. Also, in step 2 you must all start by folding the **left** corner.

How Big is Your Cube?

1. a) How long is the side of your cube? _____

b) How many centimetre cubes can be arranged along its:

- Length? _____
- Width? _____
- Height? _____



How many cm cubes in all do I need to make a platform as big as the paper cube?

Thimpu

c) Answer Thimpu's questions:

To make the first layer on the table how many cm cubes will I use? _____

How many such layers will I need to make a paper cube? _____

d) So the total cm cubes = _____

e) The volume of the paper cube is same as _____ cm cubes.

If we begin with square paper of side 19.5 cm, then we get a cube of side 7 cm.

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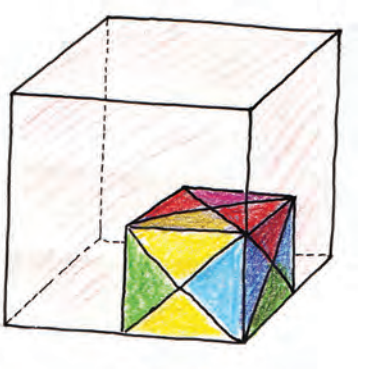
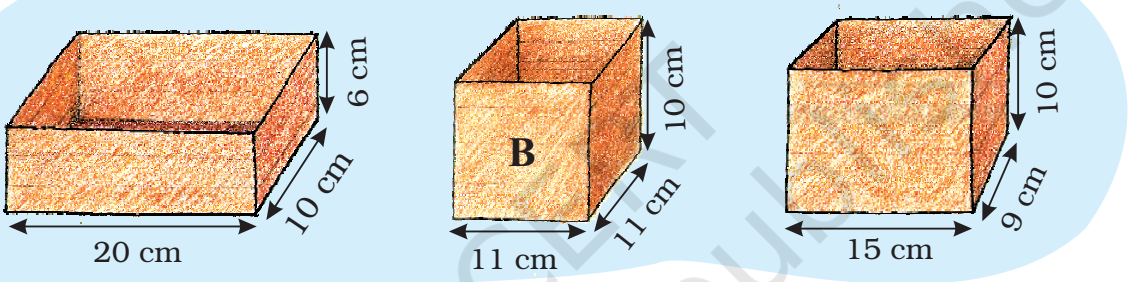
2. Anan made a big cube having double the side of your paper cube.

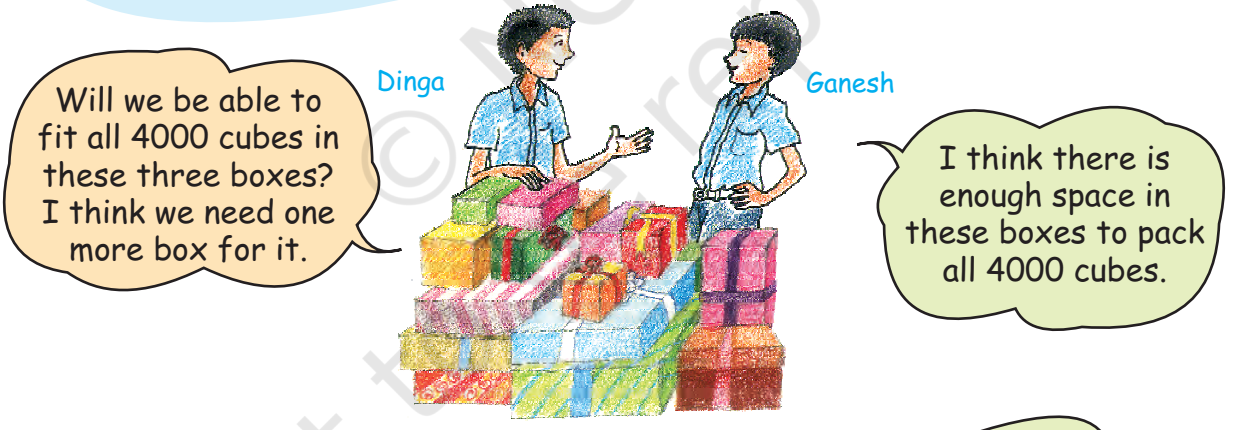
How many of the your paper cubes will fit in it? Try doing it by collecting all the cubes made in your class.



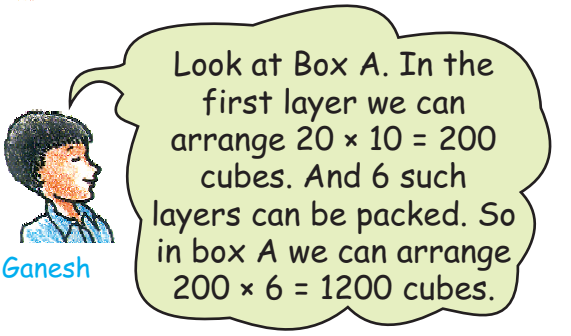
Packing Cubes

Ganesh and Dinga want to pack 4000 centimetre cubes in boxes. These are to be sent to a school. There are three different boxes available for packing.





- What is your guess? Who is right?
- How can Ganesh and Dinga test their guesses before packing the cubes in the boxes? Discuss with your friend.



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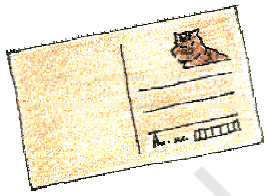
Use Ganesh's method and write:

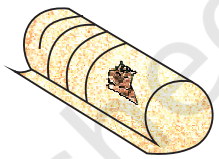
- _____ centimetre cubes can be arranged in box B.
- _____ centimetre cubes can be arranged in box C.
- So _____ centimetre cubes in all can be packed in the three boxes.

Which Pipe Fills More?



Collect some old postcards. You can also use thick paper of size 14 cm × 9 cm.

Fold the postcard along the **width** to make pipe-1. Join the ends with cello tape.



Take another postcard and fold it along the **length** to make pipe-2. Join the ends with tape.

- Guess which pipe can take more sand inside it. Hold it on a plate and pour sand to check your guess. Was your guess correct? Discuss.

Now do the same with other pipes shown here.

To make the triangle-shaped pipe-3, draw two lines on the postcard. Fold the postcard along the lines. Join the ends with tape.

Now make the square-shaped pipe-4.

Find out which pipe can take the most sand inside it. So which pipe has the most volume?

Remind children of the thread activity on page 155 where they may have seen that out of the shapes they made with a fixed perimeter, the circle had the biggest area. Here they will be looking for the shape with the biggest volume while they keep the area of the paper fixed.

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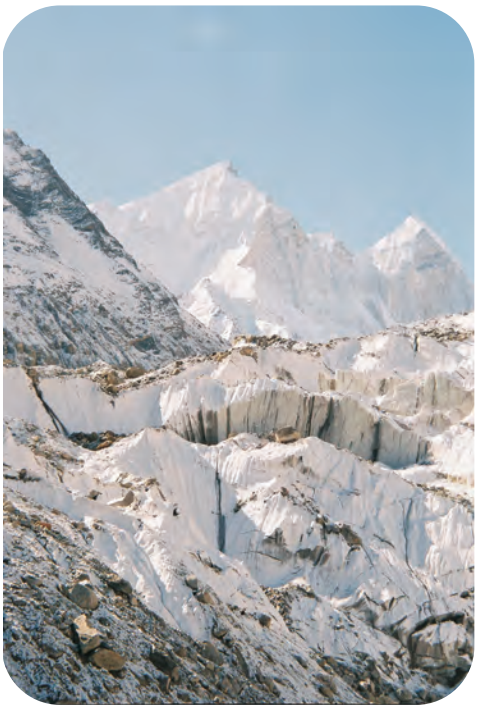

Trek to Gangotri

The students of Class XII are going on a trek to Gangotri. They have to pack their bags for six days and keep them light. They also have to take things that do not take too much space. So they will look for things that have both less volume and less weight. After all, they will carry their own bags while climbing the mountains!

They even dry the onions and tomatoes to make them light. One kg of onions or tomatoes becomes 100 g when the water inside dries up.

The list of food each person will need for **one day**:

- **Rice**: 100 g
- **Flour (*Atta*)**: 100 g
- **Pulses (*Dal*)**: $\frac{1}{3}$ the weight of rice and flour
- **Oil**: 50g
- **Sugar**: 50g
- **Milk powder**: 40g (for tea, porridge, and hot drink)
- **Tea**: Around 10g
- **Dalia**: 40g for breakfast.
- **Salt**: 5 g
- **Dried onions:** 10 g
- **Dried tomatoes:** 10 g

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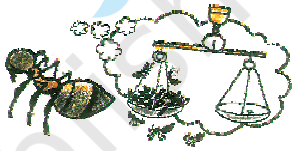
a) For 6 days, each person will need

? Rice and flour – _____ g ? Pulses – _____ g

? Dried onions – _____ g

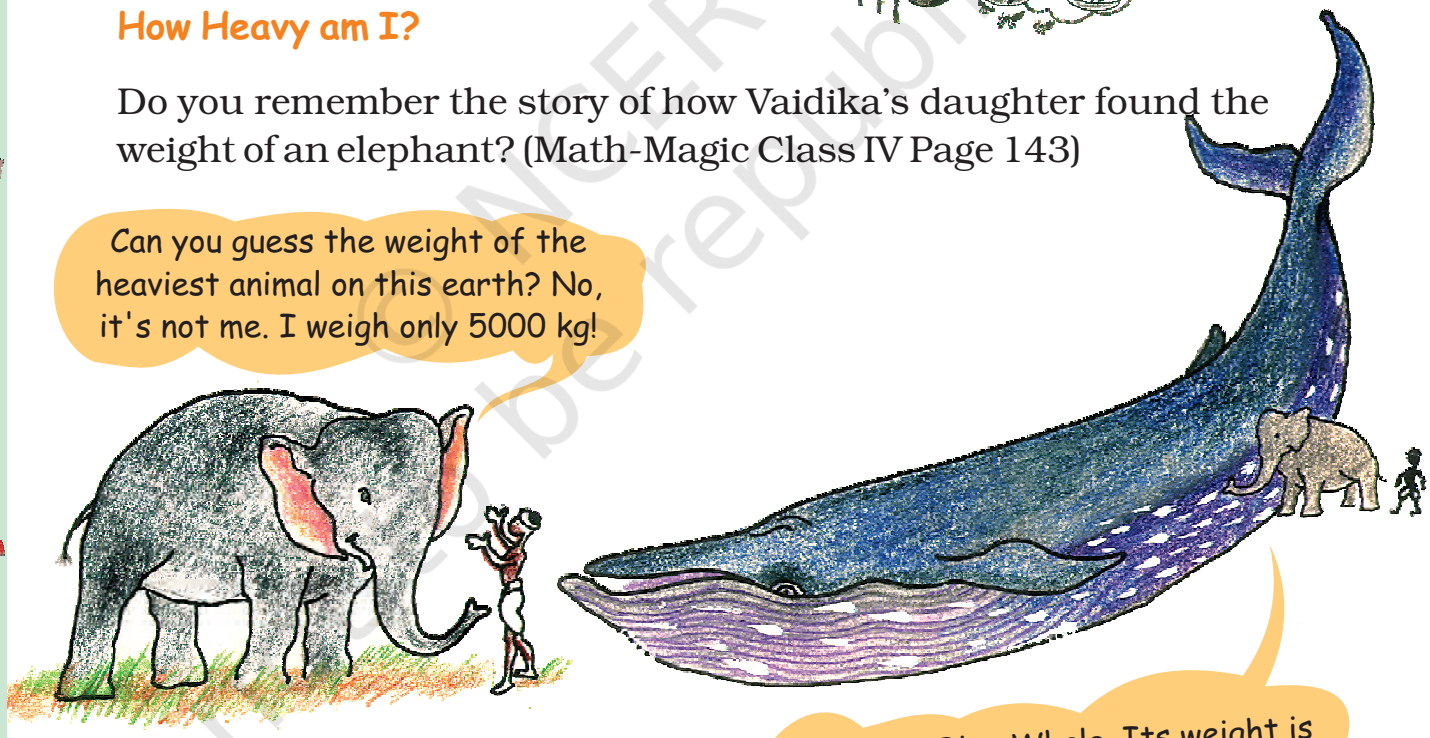
b) How much of fresh tomatoes should be dried for 6 days for 10 people?

c) What is the total weight of food (for 6 days) in each person's bag?



How Heavy am I?

Do you remember the story of how Vaidika's daughter found the weight of an elephant? (Math-Magic Class IV Page 143)



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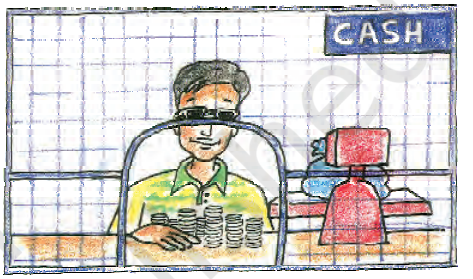
- Guess how many children of your weight will be equal to the weight of an elephant of 5000 kg.
- At birth, a baby elephant weighs around 90 kg. How much did you weigh when you were born? Find out. How many times is a baby elephant heavier than you were at birth?
- If a grown up elephant eats 136 kg of food in a day then it will eat around _____ kg in a month.

  Guess about how much it will eat in a year.

Shahid Saves the Bank!



Shahid works in a bank. He sits at the cash counter. Whenever there are too many coins he does not count them. He just weighs them.

Weighing is so much easier! The weight of a 5-rupee coin is 9 g. Tell me the weight of the sack and I will tell you the number of coins in it.

Can you hold these coins and say which is the heaviest?

My bag of 5 rupee coins weighs 9 kg. So how many coins does it have?

One kg is equal to 1000g so 9 kg is equal to 9000 g. If one coin weighs 9 g, then the bag weighing 9000 g has 9000 ÷ 9 =_____ coins in it. Easy!

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❊ How many coins are there in a sack of 5 rupee coins if it weighs:

a) 18 kg? _____ b) 54 kg? _____

c) 4500 g? _____ d) 2 kg and 250 g? _____

e) 1 kg and 125 g? _____

2250 g can also be written as 2 kg and 250 g. Can you explain why?

❊ A 2 rupee coin weighs 6 g. What is the weight of a sack with:

a) 2200 coins ? _____ kg _____ g b) 3000 coins? _____ kg

❊ If 100 one rupee coins weigh 485 g then how much will 10000 coins weigh? _____ kg _____ g

With your eyes closed, can you tell which is heavier — a 100-rupee note or a 50-rupee note? This may be difficult to say, but Shahid, who cannot see, has a better sense of touch than most people.

Once Shahid noticed that a bundle of notes which came to the bank felt different and heavier. He asked the manager to check. Others looked at it but found no problem. He insisted and so a machine was brought to weigh it. It showed that the notes were fake, not real ones. "Oh Shahid! You really saved the bank!" said everyone.

Find out and discuss

❊ How do people who cannot see make out different notes and coins? *(Hint: Look for a shape ▲, ■, ●, ▬ etc. on notes of ₹ 20, 50, 100, 500 etc. and feel it.)*

❊ What should we look for to check if a 100-rupee note is real or fake?

During the discussion on checking a note as fake or real, different things can be observed. A fake note may differ in size, quality of paper and printing or the style in which numbers are written. The watermark (the white area with Gandhi's image) and the words 'Hkkjr' and 'RBI' written on the shiny security thread are meant to prevent people from printing fake notes.

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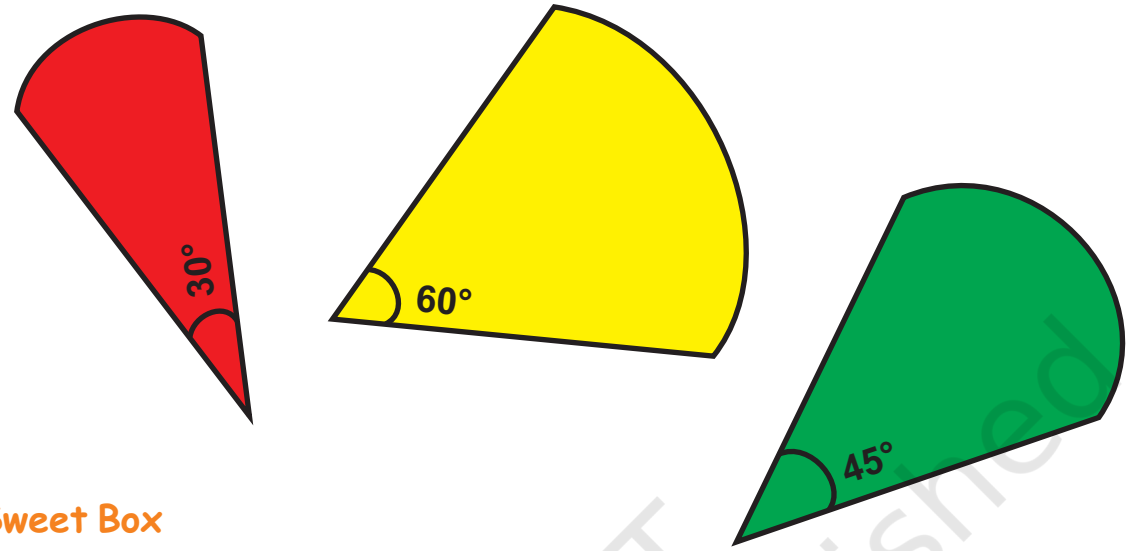
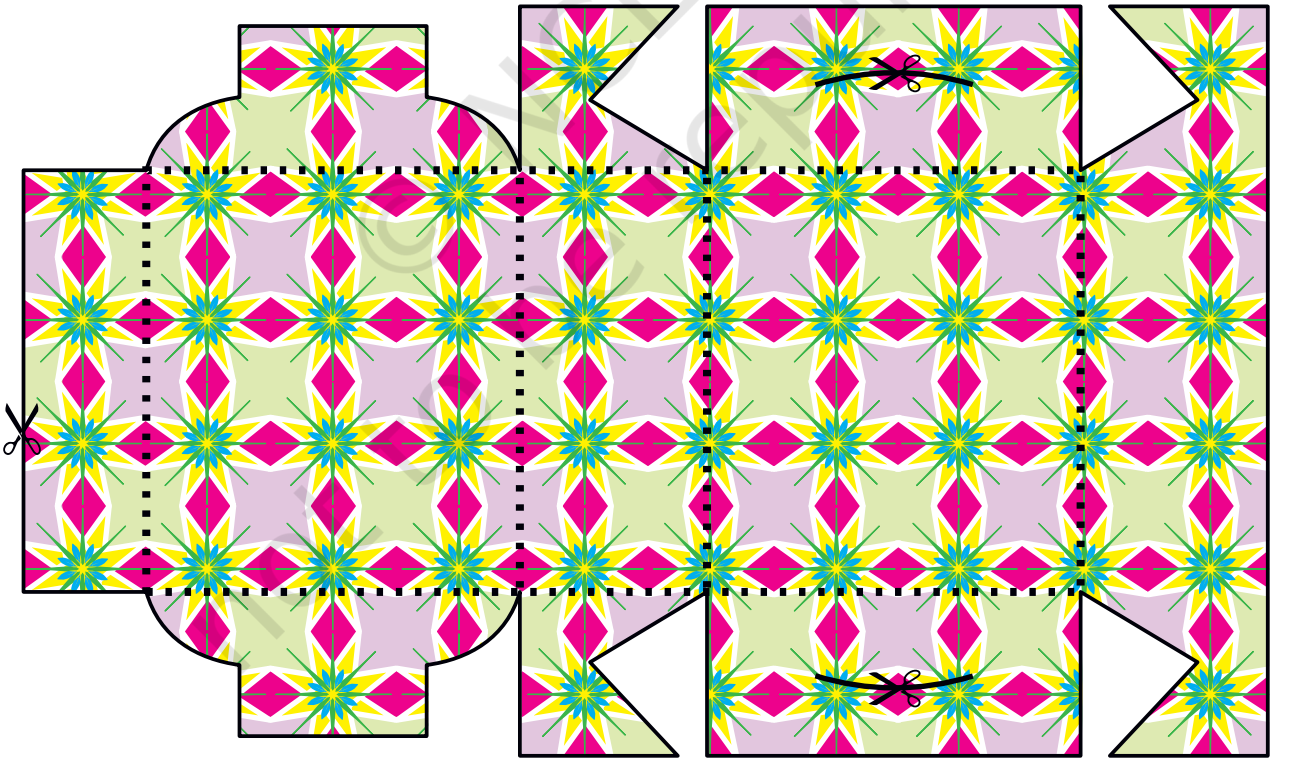
A Page to Cut Out

Angles



Sweet Box

Cut along the dark lines. Paste the shape on a thick paper. Fold along the dotted lines to get a sweet box as shown on page 126.



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Notes

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